

FOURTH
ANNUAL REPORT
1959

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Ontario Water Resources Commission
Parliament Buildings
Toronto

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A. M. SNIDER, CHAIRMAN
W. D. CONKLIN, Q.C.
C. S. MACNAUGHTON, M.P.P.
R. M. SIMPSON
JAMES A. VANCE
A. A. WISHART, Q.C.

ONTARIO WATER RESOURCES COMMISSION

EAST BLOCK - PARLIAMENT BUILDINGS
TORONTO

DR. A. E. BERRY
GENERAL MANAGER
BRIAN LARMOUR
SECRETARY

March 8th, 1960.

To the Honorable Ray Connell
Minister of Public Works

Sir,-- I have the honor to submit for your approval
the Fourth Annual Report of the Ontario Water Resources
Commission, made in conformity with and under provisions
of The Ontario Water Resources Commission Act, 1957.

I have the honor to be, Sir,

Your obedient servant,

A handwritten signature in cursive script, appearing to read "A. M. Snider", is written over the typed name "Chairman".

Chairman.



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ONTARIO WATER RESOURCES COMMISSION

EAST BLOCK — PARLIAMENT BUILDINGS
TORONTO

DR. A. E. BERRY
GENERAL MANAGER
BRIAN LARMOUR
SECRETARY

March 4th, 1960.

A.M. Snider, Esq.,
Chairman,
Ontario Water Resources Commission,
East Block, Parliament Buildings,
Toronto, Ontario.

Dear Sir:

It is with pleasure that I present to you
and the other Commissioners of the Ontario Water
Resources Commission this, the Fourth Annual Report
of the Commission.

Yours sincerely,

A handwritten signature in cursive script, appearing to read "A. E. Berry".
General Manager.



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Parliament Buildings
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FOURTH ANNUAL REPORT

Ontario Water Resources Commission
1959

INTRODUCTION by

Dr. A.E. Berry
General Manager and Chief Engineer

The Fourth Annual Report of the Ontario Water Resources Commission records an active year in which marked progress was made. The various activities in the Commission's program advanced in both intensity and volume. Much construction work was undertaken and many projects reached the operating stage. Pollution abatement was carried on aggressively, and, all in all, the services offered by the Commission to municipalities and others were used extensively. Emphasis continued to be placed on the provision of water supplies, where necessary, and adequate treatment of sewage and industrial wastes.

In the year's activities the staff of the Commission endeavored to cope with many problems resulting from the ever-expanding program, and for much of the time insufficient personnel to meet the requirements. While the staff was increased substantially during the year, it was not possible to obtain enough qualified personnel to deal fully with all selected projects. The administrative branch of the Commission was expanded as the work increased. The Construction Division, responsible for supervision over construction, was enlarged as the projects grew in number and scope. The Division of Plant Operations, responsible for the operation of the completed projects, received greater responsibilities during the year.

The Laboratories and Research Division, housed in temporary quarters, had a heavy program to support the many other activities of the Commission. The Sanitary Engineering Division, responsible for the supervision of water supplies, sewage disposal, and stream sanitation, carried on as much work as staff and time permitted, while the Division of Water Resources spent much effort in the development of ground water, and in the investigation of surface supplies.

Changes in the Commission

When the Commission was established in 1956, five Commissioners were appointed. The vacancy created by the death of W.H.C. Brien of Sault Ste. Marie in 1957 was filled in December, 1958, by the appointment of the Honorable John P. Robarts, Q.C., M.P.P., London, Minister Without Portfolio. In 1959, A.A. Wishart, Q.C., of Sault Ste. Marie was appointed April 23.

The Commission, at the end of the year, consisted of the following:

A.M. Snider, Waterloo, Chairman; commissioners, W.D. Conklin, Q.C., Kingsville, Hon. John P. Robarts, Q.C., London, R.M. Simpson, Arnprior, J.A. Vance, Woodstock, and A.A. Wishart, Q.C., Sault Ste. Marie.

Amendments to Legislation

The Commission functions under The Ontario Water Resources Commission Act, 1957, and amendments thereto. Some further amendments were made at the 1959 session of the Legislature to facilitate operations, particularly in regard to measures for the construction of water and sewage works and the financing of these. The amendments came into effect on March 26, 1959. While there also were amendments in 1958, the Legislation introduced in 1957 was not altered materially. It has been found, in general, to be effective for the program undertaken.

Administration of Commission's Program

No major changes were made during the year in the administrative arrangements of the Commission. In addition to the Main Office, or Administrative Branch, five divisions function, namely: Construction, Plant Operations, Laboratories and Research, Sanitary Engineering, and Water Resources. The head of each division is a director. As of the end of 1959, no director had been appointed to the Water Resources Division. Branches of the different divisions are under the control of supervisors.

At the end of the year, the staff totalled 189 including 22 OWRC operators on completed projects. The number on the staff varied from time to time. There were several resignations, and during the summer the total figure was augmented by casual staff. Seven members of the staff were on leave of absence from September in order to take post-graduate work at the University of Toronto. The retirement of A.V. DeLaporte, Director of Laboratories and Research, took place on September 23. He had been with the Commission since its inception, and served with distinction as head of the Laboratory Branch of the Sanitary Engineering Division in the Ontario Department of Health.

The organization consisted of the following:

Administration

General Manager and Chief Engineer -- Dr. A.E. Berry
Secretary -- Brian Larmour
Executive Officer -- W.S. MacDonnell
Solicitor -- N.A. Shepherd
Information Officer -- John C. Scott
Chief Accountant -- W.M. Ross

Division of Construction

Director -- Allan W. Shattuck

Division of Laboratories and Research

Director, A.V. DeLaporte (until retirement)
Assistant Director and
Supervisor, Industrial Wastes -- F.A. Voegel
Supervisor, Chemical Laboratory -- C.E. Simpson
Supervisor, Purification Processes -- J.G. Duncan
Bacteriologist -- L.T. Vlassoff
Biologist -- J.H. Neil

Division of Plant Operations

Director -- D.S. Caverly

Division of Sanitary Engineering

Director -- G.M. Galimbert

Supervisor, Field Activities -- E.W. Johnston

Supervisor, Sewage Works -- L.E. Owers

Supervisor, Water Works -- K.H. Sharpe

Supervisor, Stream Sanitation -- O.V. Ball

Division of Water Resources

Supervisor, Ground Water -- A.K. Watt

Supervisor, Surface Water -- K.E. Symons

Office and laboratory facilities were a handicap as the organization grew. In addition to the accommodation in the East Block of the Parliament Buildings for the Main Office, the balance of the staff was scattered in offices at various locations, thereby making the administrative problem more difficult. The laboratories of the Commission functioned throughout the year in temporary quarters in a former school building at 46 Wellesley Street West. This building also housed other branches while space was utilized at 67 College Street and 30 and 34 Grosvenor Street. Crowding was experienced in most offices. Construction continued throughout the year on the new laboratory building on Highway 401, west of the Humber River in northwest Metro Toronto. It had been expected to be ready for occupancy sometime during the summer. However, it was not completed at the end of the year, and was not likely to be available until March of 1960.

Summary of Significant Work Items

Each division of the Commission has summarized in this report the main features of the work carried on during the year. A review of these activities will offer convincing evidence of the wide extent of the Commission's work and its continued growth. New activities were undertaken during the year, while former programs were continued.

A summary of some of the more significant items in the year's activities are listed herewith.

Certificates for Water and Sewage Works

The approval of the Commission is required for the installation or extension of all public water and sewage projects in the Province. The extent of this activity may be seen from the number of certificates issued and the estimated expenditures for these works. During 1959, these figures reached the high total of 1,975 certificates, with an estimated expenditure of \$115,726,003 as compared with 1,594 certificates and an expenditure of \$109,520,113.19 for the previous year. It will thus be seen that the expenditures approved reached an average of nearly \$10 million per month. The 1959 figures were the highest since the Commission was established.

Summary:

<u>Water Works:</u>	<u>Estimated Cost</u>
Extensions to existing systems	\$ 35,813,274.17
Purification of water supplies	6,102,249.77
New systems	<u>343,354.47</u>
Total	\$ 42,258,878.41
 <u>Sewage Works:</u>	
Extensions to existing systems	\$ 64,779,965.39
Treatment works	5,943,747.82
New systems	<u>2,743,411.38</u>
Total	<u>\$ 73,467,124.59</u>
 Grand Total All Works	 \$115,726,003.00

The nature of these works, and in which municipalities they were carried out will be found in the report of the Sanitary Engineering Division.

The Commission undertakes agreements with certain municipalities primarily for construction of water supply works, trunk sewers and sewage treatment plants. It does not, except in small communities, undertake construction of local watermains or sewers. During the year, 117 certificates were issued for OWRC projects, amounting to a total of \$16,274,984.94. These included 54 certificates for water works at an estimated cost of \$5,301,887.86, and 63 certificates for sewage works at a cost estimated at \$10,973,097.08.

Construction Program

The construction programs are based on agreements between municipalities and the Commission. The policy, as continued during the year, involved designing, constructing, financing and operating works involved in these agreements. The estimated expenditures for OWRC projects rose from \$31,294,738 at the close of 1958 to \$40,894,294 at the end of 1959. The details of the various projects since the Commission undertook this work are shown in the following table. This reveals that at the end of the year there were 95 projects either completed, under construction, or under agreement. Of these 52 were water, and 43 were sewage projects. These involved 83 municipalities.

OWRC Projects are listed by the Project Control section as Completed, Under Construction or Under Agreement as at December 31, 1959:

<u>Water Works</u>	<u>Actual or Estimated Cost</u>	<u>Sewage Works</u>	<u>Actual or Estimated Cost</u>
xAlfred	\$ 133,344.	xBancroft	\$ 105,179.

Water Works (Cont.)

	Actual or Estimated Cost
\$	
xBancroft	248,396.
xBelle River	55,648.
xBolton	62,251.
xBrock Twp. (Sunderland)	100,840.
xDresden	171,763.
xDresden	18,082.
xDundas	341,866.
xEssex Town	86,390.
xFrankford	119,313.
xHarrow	497,513.
xHavelock	177,282.
xKitchener	288,370.
xMarkham Twp.	506,979.
xMarkham Village	46,744.
xMaidstone Twp.	217,239.
xPort Perry	62,421.
xRichmond Hill	232,348.
xStayner	60,272.
xTrafalgar Twp.	211,766.
xWinchester	269,516.
yAncaster	193,154.
yBath	31,488.
yBracebridge area	70,355.
yDunnville	2,402,820.
yEssex County (Union System)	3,908,950.

Sewage Works (Cont.)

	Actual or Estimated Cost
\$	
xConiston	472,784.
xFrankford	163,344.
xKorah Twp.	44,309.
xLeamington	85,855.
xPort Arthur	2,168,791.
xRichmond Hill	358,537.
xStratford	924,266.
xStratford	84,901.
xStreetsville	308,171.
xToronto Twp.	500,749.
xTrafalgar Twp.	257,673.
xWestminster Twp.	253,230.
yBarrie	270,760.
yBrampton- Chinguacousy	1,360,000.
yBrantford	2,166,686.
yBurlington	380,172.
yFergus	260,000.
yGalt	257,160.
yGeorgetown	825,570.
yHuntsville	440,692.
yKitchener	2,094,500.
yListowel	448,400.
yLondon Twp.	922,880.
yMarkham Village	567,100.
yMcKim Twp.	262,900.

Water Works (Cont.)

	Actual or Estimated Cost
\$	
yHuntsville	78,125.
yLeamington	22,234.
yMeaford	443,630.
yMidland	46,448.
yMitchell	107,241.
yOrangeville	72,500.
yPreston	266,910.
Bertie Twp.	644,000.
Caledon East	75,000.
Elmvale	55,000.
Hastings	139,100.
Hespeler	12,740.
Kenora	99,070.
Marmora	174,920.
Parkhill	110,000.
Thedford	165,000.
Val Albert	227,075.
tdCannington	4,000.
tdChesterville	12,000.
tdCookstown	5,000.
tdGrand Bend	9,000.
tdMcGregor area	8,000.
tdNewcastle	10,000.
tdPort Burwell	3,000.
tdTara	5,000.
tdWhitby Twp. (Brooklin)	7,500

Sewage Works (Cont.)

	Actual or Estimated Cost
\$	
yMitchell	290,938.
yNorth Bay area	2,175,530.
yOrangeville	165,860.
yStirling	222,267.
yTrenton	512,320.
yWaterloo	672,188.
yWiarton	118,900.
Hespeler	19,198.
Kenora	88,100.
Korah Twp.	125,000.
Marmora	44,000.
Nepean Twp.	1,261,820.
Paris	1,300,000.
Point Edward	685,494.
Sault Ste. Marie	3,165,700.
Tarentorus Twp.	157,000.
Tillsonburg	587,767.

Water Works Total \$13,317,603. Sewage Works Total \$27,576,691.

GRAND TOTAL - WATER WORKS AND SEWAGE WORKS \$40,894,294.

x - in operation y - under construction td - test drilling

The report of the Construction Division revealed the nature and the status of each project which was under way during the year. These projects involved both large and small works, with special emphasis placed on the undertaking of works for smaller communities. It should be noted that the expenditures on OWRC projects for sewage works was more than double that for water works. This was to be expected, since water works generally are undertaken by municipalities before sewage works. This meant delay in some instances in the construction of trunk sewers and sewage treatment plants, but the Commission's program was aiding municipalities materially to catch up on these works.

Operation of OWRC Projects

The policy of the Commission in assuming responsibility for the operation of each of its projects after construction is completed has a number of advantages. It results in close liaison between the Commission and the municipalities, and it insures for the municipalities the technical skill and assistance necessary in the operation of treatment plants, particularly sewage. Unless given proper attention these are likely to deteriorate to the point where the money spent would not bring the desired results.

The Division of Plant Operations had under its supervision at the end of the year 21 water projects and 13 sewage works, an increase of 17 during the year. Information on these projects is found in the report of the director of the division. The operating staff for these various projects at the end of the year numbered 22.

The policy of working closely with local advisory committees was continued and encouraged by the Commission during the year. Each municipality with a project is asked to appoint a local Advisory Committee of about five or six persons. These committees work closely with the staff of the Commission. In this way, it may be considered that these activities are truly joint operations in which the skills of both parties are directed to ensure best results. It is to be noted, under these circumstances, that the services of the Commission can be utilized to advantage in directing plant operators. It is also possible to encourage training of operators and to give them all assistance in their work.

Sanitary Engineering Activities

The Sanitary Engineering Division of the Commission assumes responsibility for supervision over water works, sewage works, stream pollution, and all related matters. The details of the activities of that section during the year are recorded in the separate report of the division. However, some comments pertaining to the water and sewage works of the Province are of interest:

(a) The number of municipal water works system in operation at the end of the year was 419. These served a total population of 3,950,000, or approximately 69% of the entire Province. Contact was maintained with these systems during the year by the OWRC district engineering staff. This staff made 241 inspections of water purification plants as well as 182 inspections of water works systems in general. Samples to the number of 1,014 were taken for bacteriological tests and 326 for chemical determinations.

(b) Sewage works - Considerable progress was made during the year in making sewage works available for urban centres. The extension of sewers and the construction of treatment works continued at a high pace. At the close of the year, the number of sewerage systems in operation totalled 246. These served a population of 3,755,000, or approximately 64.8% of the population of the Province. Sewage treatment plants put into operation in 1959 included those at Port Arthur and Westminster Township, Brantford, Brampton, Fergus, Trenton, Georgetown, Huntsville, London Township, Markham, Sarnia, and Metro Toronto's Humber Valley and Ashbridge Bay plants were nearing completion.

The district engineering staff made 295 inspections of treatment plants during the year. In addition, there were 194 inspections of sewage works, 490 industrial wastes, and 54 drainage inspections carried out. These involved 889 samples for bacteriological testing, 1,573 for chemical and 13 for special determinations.

At the end of the year, a substantial list of sewage treatment projects was noted in various stages of development. When these are completed they will do much to control pollution of the water-courses of the Province and thereby make these waters more valuable as resources for all general use.

(c) Industrial wastes - Industrial wastes may have an injurious effect on the receiving watercourses. It is recognized that these wastes must be given treatment along with the domestic sewage, and considerable emphasis in the Commission's program has been devoted to them. These wastes are many in number and come from many sources such as canning factories, milk plants, oil refineries, tanneries, plating works, pulp and paper mills, and chemical industries. Where these wastes are to be discharged to a watercourse, they must receive treatment in the same way as would be expected for municipal sewage. If the waste goes into a public sewer, it then becomes the responsibility of that municipality to provide treatment along with the domestic sewage.

Good progress was made during the year in meeting the problems of industrial wastes and the pollution of streams.

(d) Stream sanitation - Inventory of the quality of the streams of the Province is essential at all times if effective control measures are to be implemented. Accordingly, a good deal of emphasis was placed during the year on stream pollution investigations. This was based on surveys on a county unit, as well as on streams or watersheds. Complete surveys were made on 25 different streams, with repeat surveys on four of these. Pollution investigations were also carried out at 320 locations on 126 streams or lakes.

An important feature in stream sanitation work is found in those communities which do not have sanitary sewers. Many of these have storm drains to which connections have been permitted, and serious pollution results therefrom. Detailed investigations of these sources of pollution and sampling of the stream does much to aid in the correction of this. Municipalities co-operated in overcoming these outlets. Much of this work must be done in the summer months, and to expedite this university student personnel were obtained during that period. The degree to which this work can be carried on is based on available staff and laboratory facilities.

(e) Activities in the districts - The Province is divided into four districts, each under the supervision of an engineering staff headed by a District Engineer. Regular supervision of all water and sewage plants is carried out by this staff, and samples of water supplies, sewage and streams are collected for assistance in control work and for advising the municipalities.

(f) Subdivision plans - The review of all subdivision plans submitted to the Department of Planning and Development was continued by the Commission throughout the year with particular reference to water supply, sewage disposal, and soil conditions. These involved 1,155 subdivisions as compared with 802 for the previous year. This resulted in close co-operation between these two Ontario Government agencies. This work is important in that it prevents inadequate water and sewage facilities in growing communities.

(g) Plumbing regulations - Plumbing Regulations of the Province are under the supervision of the Commission. These Regulations required amendments which had been agreed upon at the end of the year. It was expected that the changes contained in the amendments would be put into effect early in 1960.

Water Resources Activities

Information on the work carried out in the Water Resources Division is found in reports of the Ground Water Branch and the Surface Water Branch.

(a) Ground Water Branch - This branch maintains supervision over water well records, and the licensing of drillers of water wells. During the year, records for 7,948 wells were filed with the branch. This was approximately 1,000 more than the previous year. These records constitute valuable information when ground water is being studied throughout the Province. Similarly, the licensing of 394 drilling contractors was carried out. Contacts were made with these drillers by the field staff.

The services rendered by the branch expanded markedly during the year. Much of this was due to the requests from municipalities for assistance in the investigation of ground water supplies. Investigations and field surveys were carried out for 55 separate municipalities, many of which resulted in wells being made available as sources of public water supply. Guidance was given in test drilling operations. As part of this program, 31 observation wells were in use at the end of the year. Ten of these wells were equipped with automatic

recorders.

The importance of ground water supplies to the Province and particularly to the smaller communities is very real. Generally speaking, these waters do not require treatment, and they are cheaper to develop than surface supplies. It is thus significant that attention should be given to this part of the Commission's program.

(b) Surface Water Branch - This branch was organized during the year in an effort to develop information on surface water supplies and to carry out surveys which would be beneficial in the use of these sources. The importance of surface waters as part of the water resources of the Province is recognized not only for supplying water for domestic or industrial consumption but also for carrying sewage effluents. It is hoped to continue this activity on a wider basis as staff and facilities may become available.

Laboratories and Research

This division has a major part in the program of the Commission. It is responsible for the examination of samples submitted by all field staff, and for making available information essential in the control of many conditions in water and sewage projects as well as industrial wastes.

The activities of the laboratories were made more difficult by the use of temporary quarters on Wellesley Street at Bay Street. It was anticipated that the new laboratory would be completed before the end of the year, but construction delays were encountered. The new building, to be occupied in 1960, will be modern in every respect, and will offer first-rate facilities for the examination of samples and for the carrying out of research studies. It is also proposed to hold conferences and courses of instruction in the new laboratory where a lecture hall has been provided as well as a laboratory set aside for instruction purposes.

Work of the laboratory is organized under a number of different branches, including bacteriological, chemical, biological, industrial wastes and purification processes.

The Bacteriological Branch experienced an increase in work-load of approximately four times since the formation of the Commission. This is well illustrated in the charts found in the report of the Division. A total of 9,126 samples were examined during the year.

A similar condition was experienced in the Chemical Branch where there was an increase of 53% in chemical determinations over the previous year. The number of analyses carried out totalled 63,124 on 14,077 samples.

The Industrial Wastes Branch is concerned with the investigation of industrial wastes throughout the Province. The year's work involved 450 industrial waste investigations and examinations. Through this program efforts are made to control all industrial wastes which may have a detrimental effect on receiving watercourses. Where the wastes go directly into municipal sewers, studies are made to determine what degree of treatment is desirable before these wastes are accepted in

the municipal plant. Some of these wastes have detrimental effects even though discharged in small quantities. Examples of this are phenolic wastes and cyanide-bearing wastes. The former has an adverse effect on taste in water and also tends to taint the flesh of fish, whereas the cyanide wastes are quite toxic.

The Biology Branch paid particular attention during the year to nuisances caused on shores by the collection and decomposition of the algae Cladophora. Special studies and research were conducted on this problem in an effort to find some algicide which would destroy this growth without interfering with the quality of the water. Encouraging results were obtained.

The Purification Processes Branch has as its objective the investigation of processes of a special nature which may be beneficial in dealing with water pollution abatement and the more effective operation of all treatment processes. The year's activities involved a number of different measures, the information on which will be helpful in finding solutions to the many problems arising in industrial communities.

Public Information

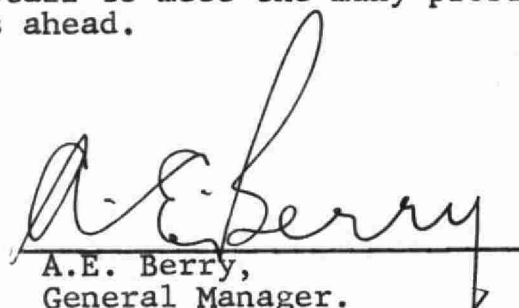
It is necessary that the program of the Commission be made known widely to the public. In this way the services of the Commission can be utilized to advantage. The Information Branch, during the year, made known information on surveys being conducted, on conferences, and on various projects which were being undertaken. A special exhibit was placed at the Canadian National Exhibition where it was seen by large numbers.

Legal Activities

The program of the Commission involving legal supervision grew markedly during the year, as more projects came into being, and further activities were undertaken. Attention was directed to bonding requirements for contractors and to the acquisition of property needed for these projects undertaken by the Commission. Prosecution procedures are instituted by the Legal Branch when it is decided there has been a violation of the requirements of the Legislation.

The Commission and Staff

It is desired to express sincere appreciation to the members of the Commission and to the staff for their co-operation during the year. It is in this way that the ever-growing program of activities can be developed effectively. It is possible to look forward with confidence on the efficiency of the staff to meet the many problems likely to be encountered in the years ahead.


A.E. Berry,
General Manager.

LEGAL BRANCH

Norman A. Shepherd, Solicitor

The year was one of marked activity within the branch corresponding to the activity of the Commission itself. In addition, many new problems developed as would be expected in a relatively new organization, which had to be overcome or at least substantial steps taken towards their solution.

The principal legislative amendments to The Ontario Water Resources Commission Act during the year were the increasing of the maximum number of commissioners from five to seven and, in response to the requests of municipalities, the authorization for municipalities having projects with the Commission to prepay monies in respect of any of the annual charges thereon.

A considerable amount of work was done on revision of "The Plumbing Code" and revised regulations thereon. This was expected to be ready early in 1960.

In the construction end of the Commission, several projects were affected by defaults of contractors. These were principally occasioned by insolvency or bankruptcy.

Some considerable difficulty was experienced in connection with bonds in these cases and after research the Commission revised its policy to require a 100% performance bond and a 100% labor and materials payment bond on each contract. It appeared as if payment bonds, though standard practice in the U.S.A. for at least 25 years, were a relative innovation in Canada and work was continuing to ensure that a water-tight and practical bond was adopted.

Special agreements were negotiated and written for projects having more than one participant at Lakeview in Toronto Township, in the Brampton area, in the Dunnville area and at Listowel.

The volume of real estate being acquired for projects was ever increasing. So far as was possible the actual work of acquisition was delegated locally and a greater or less amount of assistance was given by municipalities. It seemed to be the case, however, that splitting of control made for inefficiency and the continual pressure necessary to achieve co-ordination was difficult to maintain.

Since real estate acquisition was subsidiary to engineering and construction, the real estate end had to try to complete its functions within the time requirements of engineering and construction. Consequently, expropriation had to be used frequently where agreement might have been obtained had sufficient time been available. Attempts were being made to have the real estate branch increase its field work and get into the matter of selection of sites at an earlier stage in order to reduce the use of compulsory powers and to improve site selection.

A prosecution for pollution was instituted at Hamilton against a cannery but on the construction by the company of a large retaining basin for its wastes and the undertaking by the company to do whatever

might further prove necessary to prevent pollution, the prosecution was withdrawn.

The forms and procedures used by the Commission by the year-end substantially followed the fairly standard usage of similar bodies. The special nature of the Commission and the adaptable quality which its problems demanded of it, required, however, a careful adjustment of forms and procedures. A comprehensive overhaul was being given priority though, of necessity the rate was slow due to the amount of research and internal discussion inevitably involved in such a revision.

INFORMATION BRANCH

John C. Scott, Information Officer

As OWRC expansion continued, the work-load of the Information Branch during 1959 kept pace. Among additional duties taken over was the editing and distribution of the regular monthly reports. Volume of routine duties also increased.

Survey reports handled during the year included those dealing with conditions in Essex County, the Lakehead, the Credit River Watershed and Elgin County. Special reports in which the office was involved were those concerning the Algae Conference in Toronto and the Industrial Waste Conference at Honey Harbor. The Information Office was represented at the latter, handling all publications' arrangements as well as taking and distributing conference pictures.

The Wetlands Conference at Toronto was publicized both before and after the event, as was the cornerstone-laying at the new OWRC laboratories and research building in Etobicoke Township.



NEW OWRC LABORATORY NEARS COMPLETION

Besides handling the usual news release service, special material pertaining to the Commission was supplied to other Ontario Government departments and publications, as well as to non-government publications. Assistance was given other media in their preparation of OWRC items.

Official openings of new OWRC projects were attended and publicized, while pre-opening assistance was given the Operations Division in the preparation of special material concerning the events.

Routine preparation of the monthly OWRC News, staff publication, was featured late in the year by the inclusion of pictures. This was well received by the readers. Other routine items included the handling of all tender call and other advertisements.

A revamped OWRC exhibit at the 1959 Canadian National Exhibition was well received by CNE visitors.

CONSTRUCTION DIVISION

Allan W. Shattuck, Director

The year 1959 saw the completion of 19 OWRC water or sewage projects, with an additional 35 being under construction at the end of the year.

Herewith is a brief summary of each project with which the Construction Division was involved during the year--

Alfred (58-W-14)

Description of Project:	Water works system
Consulting Engineer:	J.L.Richards & Associates Ltd., Ottawa
Completed:	August, 1959
Estimated Cost:	\$133,344

This project comprised the construction of an intercepting tile system to collect spring water, a reservoir, pumphouse, pumping equipment and extension and alterations to the existing distribution system.

Ancaster (58-W-26)

Description of Project:	Addition to water works system
Consulting Engineer:	MacKay & MacKay, Hamilton
Expected Completion Date:	April, 1960
Estimated Cost:	\$193,154

This project consists of the construction of foundations and a 750,000 Imp. gal. steel elevated water tank to supplement the water supply. This new tank was to supply additional water storage for use chiefly during the summer months.

Bancroft (57-S-3)

Description of Project:	Sanitary sewers and services, sewage pumping station and sedimentation tank
Consulting Engineer:	R.K. Kilborn & Associates Ltd., Toronto
Completed:	April, 1959
Estimated Cost:	\$105,179

The sanitary sewers and services were completed before the end of 1958 but the pumping station contractor did not complete his work until the beginning of April. The system was put into operation early the same month.

Barrie (59-S-31)

Description of Project: Placing fill, pumphouse, sewer
forcemain and trunk sewers

Consulting Engineer: Foundation of Canada Engineering
Corporation Ltd., Toronto

Expected Completion Date: February, 1960

Estimated Cost: \$270,760

The project involved the placing of granular fill along the west shore of Kempenfeldt Bay and the installation of a system of sewers and a pumphouse on the fill. The work was being done to by-pass a section of a sewer main which collapsed due to swampy ground conditions.

The embankment fill contract consisted of placing 82,000 tons of granular fill and 500 tons of rock. The rock fill was placed to anchor the 16-inch forcemain at the point where it turns toward the existing sewage treatment plant.

The sewer contract consisted of 4,200 feet of 16-inch coated steel forcemain, 200 feet of 42-inch reinforced concrete trunk sewer, 120 feet of 22-inch by 36-inch corrugated outfall culvert and a poured concrete interceptor sewer. The 16-inch forcemain was to be installed from the pumphouse to the sewage plant. When the pumphouse was ready for operation the 42-inch concrete trunk sewer was to be completed by breaking into the existing sewer main.

Bath (59-W-40)

Description of Project: Extension of existing water system

Consulting Engineer: Campbell, Smith Ltd., Kingston

Expected Completion Date: March, 1960

Estimated Cost: \$31,488

The water main contract called for 3,879 feet of 10-inch, 8-inch and 6-inch diameter cast iron pipe. The contractor was to install the water main, hydrants and house services.

Belle River (59-W-30)

Description of Project: Extension of existing water system

Consulting Engineer: C.G.Russell Armstrong, Windsor

Completed: November, 1959

Estimated Cost: \$55,648

Difficulties in obtaining the necessary easements caused delay in construction, but the contractor finally completed the work in November, 1959.

Considerable difficulty was experienced in completing the river crossing in accordance with OWRC specifications, so this part of the watermain was laid three times before Commission acceptance.

Bolton (58-W-21)

Description of Project: Well house and trunk main
Consulting Engineer: W.O. Chisholm, Agincourt
Completed: December, 1959
Estimated Cost: \$62,251

Following completion of drilling of a deep well in March, construction was started on the 8-inch watermain which was completed in June. The pumphouse was ready late in November.

Bracebridge (58-W-27)

Description of Project: Stage I watermain and services
Stage II two small reservoirs and two pumphouses
Consulting Engineer: F. Allport, Orillia
Completed: Stage I, July, 1959
Expected Completion Date: Stage II, Spring, 1960
Estimated Cost: \$70,355

The contractor commenced work on the main-laying in April and continued without much difficulty to completion in July.

The Bracebridge P.U.C. preferred to carry out the Stage II work itself rather than by contract, and started in September. Most of the work on the large reservoir and pumphouse had been completed by early December when work was discontinued until the following spring.

Brampton (58-S-14)

Description of Project: Complete sewage treatment plant (activated sludge process, one m.g.d. capacity) trunk sewers and watermain, Brampton to treatment plant
Consulting Engineer: Proctor & Redfern, Toronto
Expected Completion Date: January, 1960
Estimated Cost: \$1,360,000

The sewage treatment plant was designed to treat one m.g.d. with primary clarifiers, aeration tanks, secondary clarifiers, chlorinator, sludge digester and sludge drying beds. All work necessary to put plant into operation had been completed by year-end. The roads and landscaping were to be completed in the spring.

The trunk sewer, comprising 12,500 feet of 42, 36 and 24-inch diameter concrete pipe connects Brampton's existing sewer system to the new plant.

The watermain connecting the plant and the town consisted of 15,270 feet of 10 and 8-inch cast iron water pipe. A 10-inch asbestos cement sewer forcemain to connect the plant and the Bramalea Subdivision also was installed, with the work carried out at the expense of the subdivision and the OWRC accepting responsibility for its maintenance.



Brantford (58-S-11)

PIPELAYING ON AN OWRC SEWERAGE PROJECT

Description of Project:

The plant, having a daily capacity of 12.5 m.g.d. and provision for future extension up to 25 m.g.d., was to be capable of giving full treatment by the activated sludge process.

Consulting Engineer:

Proctor & Redfern, Toronto

Expected Completion Date:

January, 1960

Estimated Cost:

\$2,166,686

During the construction period no special difficulties were encountered except at the foundations for the pumping station and detritor building (quicksand) so that it was necessary to modify the design.

Burlington (58-S-28)

Description of Project:

Completion and enlargement of the sewage disposal plant in Elizabeth Gradients together with the necessary outfall sewer into Lake Ontario. Capacity will be 750,000 Imp. g.p.d.

Consulting Engineer:

Proctor & Redfern, Toronto

Expected Completion Date:

February, 1960

Estimated Cost:

\$380,172

The pumphouse, primary clarifier and chlorine contact chamber were completed under a previous contract. In regard to the completion and enlargement of the plant, the concrete work was completed and most of the piping and equipment installed by early December when the job closed down because of a district carpenters' strike. The plant was to be ready for operation about four to six weeks after resumption of work.

Dresden (59-W-43)

Description of Project: Addition to water works system
Consulting Engineer: OWRC
Completed: December, 1959
Estimated Cost: \$18,082

This was stage #2 of the Dresden water works scheme and was necessary in order to meet the requirements for the supply of cooling water to the Canadian Cannery Limited plant during the fall canning season. This project consisted of the installation of 1,200 lineal feet of 10-inch cast iron watermain and appurtenances, one 500 Imp. g.p.m. pump in the low lift pumping station, one 400 Imp. g.p.m. pump in the high lift pumping station and a chlorinator in the low lift pumping station.

Dunnville (58-W-17)

Description of Project: Contract 'A' - Intake and crib structure
Contract 'B' - Filtration Plant and pipelines. Tenders had not been called by the year-end.
Consulting Engineer: Canadian British Engineering Consultants, Toronto
Expected Completion Date: Contract 'A' July, 1960
Estimated Cost: \$2,402,820

Construction commenced at the beginning of December.

Essex County Union Water System (57-W-12)

Description of Project: Lake intake, water filtration plant and trunk main system
Consulting Engineer: C.G. Russell Armstrong, Windsor
Expected Completion Date: January, 1960
Estimated Cost: \$3,908,950

All contracts under this scheme were substantially completed by the end of the year except for final grading, access roads and landscaping at the plant site. Tests of the equipment and sterilization of the plant and reservoir were in progress.

The work was delayed several times by strikes, changes in design and weather conditions.

Fergus (58-S-23)

Description of Project: Sewage treatment plant
Consulting Engineer: Proctor & Redfern, Toronto
Expected Completion Date: April, 1960
Estimated Cost: \$260,000

Legal difficulties with the former owner of the land caused a late start and higher construction costs for this project, but progress was better than anticipated. All outside piping, concrete work and sludge-drying beds were completed before the freezing period started. The machine room and office building was also closed in at the end of the year and the whole plant made ready for the installation of the equipment.

Frankford (58-S-9)

Description of Project: Sanitary sewers, services and sewage treatment plant (primary treatment with high-rate filter, capacity 540,000 g.p.d.)
Consulting Engineer: Graham Reid & Associates, Ltd., Toronto
Completed: February, 1959
Estimated Cost: \$163,344

Use of the sewage works was delayed until February owing to some difficulties with the operation of equipment at the treatment plant. The initial flow of sewage was insufficient to prevent freezing in the clarifier tank and it was necessary to by-pass the tank until early April.

Galt (59-S-30)

Description of Project: 6,300 feet of sanitary sewer
1,500 feet of storm sewer
Consulting Engineer: Proctor & Redfern, Toronto
Completed: December, 1959
Estimated Cost: \$257,160

This sewer was laid for the most part in rock and progress was delayed, particularly in the late stages. The last pipe was not laid until December 23rd. Some pavement patching was to be carried out in the Spring of 1960.

Georgetown (58-S-17)

Description of Project: Contract No. 1 - Sanitary trunk sewer along the valley of the west branch of the Credit River from the existing plant to site of new sewage treatment

plant.

Contract No. 2 - Sewage treatment plant, activated sludge, 1.5 m.g.d.

Consulting Engineer: Proctor & Redfern, Toronto

Expected Completion Date: Contract No. 1 - January, 1960
Contract No. 2 - September, 1960

Estimated Cost: Contract No. 1 - \$162,894
Contract No. 2 - \$662,676

Construction on Contract No. 1 was completed in August but due to bankruptcy of the contracting firm, East End Excavators, clean-up and leakage tests could not be completed. January, 1960, was set for completion date.

Work started on Contract No. 2 in December.

Hespeler (59-S-37; 59-W-33)

Description of Project: Additions to water works system and sanitary sewers on two streets

Consulting Engineer: Proctor & Redfern, Toronto

Expected Completion Date: February, 1960

Estimated Cost: \$31,938

Work was not to start until January, 1960.

Huntsville (58-W-19)

Description of Project: Lake intake, low lift pumping station, pumping main, and pipework alterations in existing filtration building

Consulting Engineer: R.V. Anderson & Associates, Ltd., Toronto

Expected Completion Date: February, 1960

Estimated Cost: \$78,125

Property difficulties at the originally proposed site in a lumber-stacking yard proved to be so great that it became necessary to re-locate the works completely. The new site for the intake and pumping station involved a much longer pumping main to link it with the existing filtration building and increased the cost of the project.

The contractor's progress from a March start was very slow. The first concrete for the foundation slab of the pumphouse was poured early in June and that for the foundation walls towards the end of that month. These walls were found to have severe honeycombing in places and this necessitated breaking-out and repairing with Gunitite. The pumphouse superstructure was completed by October.

Work started on the pumping main at the end of October, but the combination of delay occasioned by the C.N.R. in giving property clearance and slow progress by the contractor resulted in the pumping main being only 50% completed by December 31st.

Huntsville (58-S-15)

Description of Project:	Contract 'A' - Sanitary sewers, force-mains and services Contract 'B' - Sewage treatment plant and three lift stations
Consulting Engineer:	R.V. Anderson & Associates, Ltd., Toronto
Expected Completion Date:	Contract 'A' - January, 1960
Completed:	Contract 'B' - November, 1959
Estimated Cost:	\$440,692

The resumption of work on Contract 'A' after the winter lay-off did not occur until April. Progress was poor and a part of this contract was assigned to another contractor to speed up construction. On May 26th, Sherk Construction, the original contractor, ceased operations completely and went into bankruptcy. Arrangements were made for Pearce Construction to complete the works. By the middle of December, all street sewers and all but about 15 services had been laid. Progress on these remaining services, all located in the main shopping district, was slow and it was not expected that they would be completed before the end of January, 1960.

Good progress was made on the treatment plant and pumping stations in Contract "B" and this work was substantially completed by August. A number of deficiencies, including leaks in floors and walls, remained outstanding for many weeks, but the treatment plant and one of the pumping stations finally were put into operation in November.

Kitchener (58-W-18)

Description of Project:	Construction of 5,000,000-gallon reservoir on Mannheim Hill
Consulting Engineer:	Proctor & Redfern
Completed:	June, 1959
Estimated Cost:	\$288,370

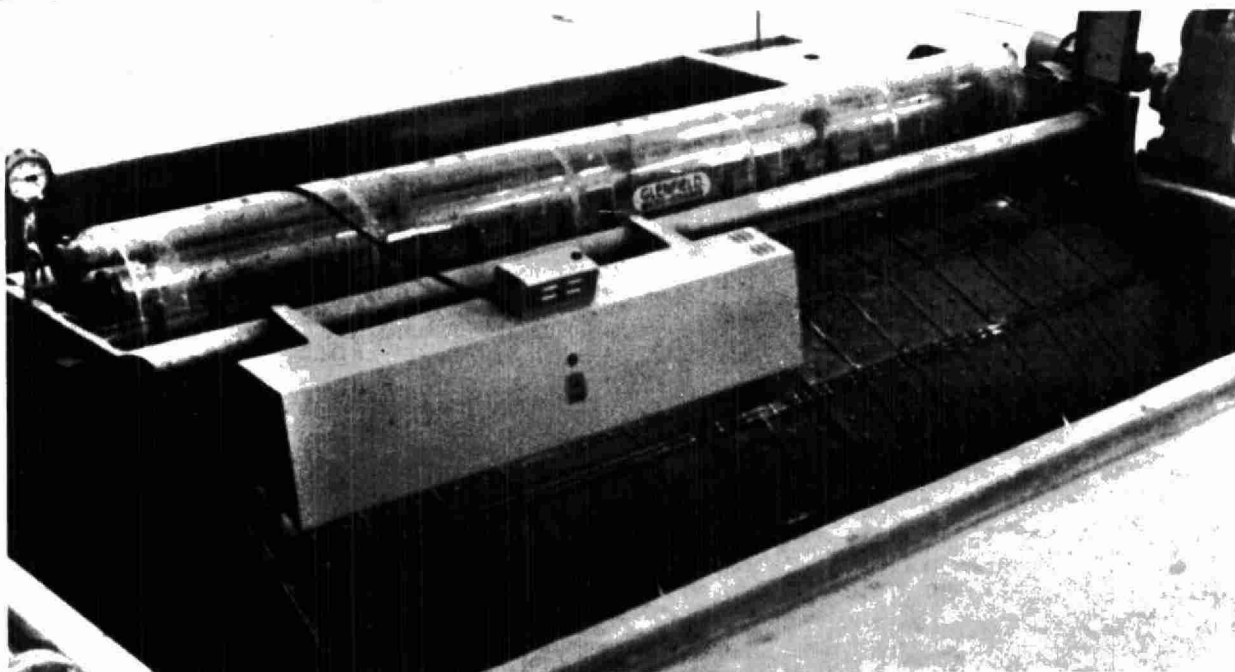
This reservoir was completed on schedule and immediately put into operation.

Kitchener (58-S-19)

Description of Project:	Sewage Treatment plant Force main and relief sewer to link existing system to new treatment plant Spring Valley pumping station
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Consulting Engineer: Proctor & Redfern, Toronto
Completed: Forcemain - July, 1959
Expected Completion Date: Plant - April, 1960
Pumping Station - April, 1960
Estimated Cost: \$2,094,500.

The construction of the treatment plant was behind schedule and was only partly in operation by the end of the year. Weather conditions, change in design and the late arrival of partly damaged equipment caused delay on the contract. A request of time extension



MICRO-STRAINER AT LARGE MODERN WATER FILTRATION PLANT BUILT BY OMRC

for the contractor was recommended.

The contractor completed the forcemain and relief sewer almost two months ahead of schedule. The quality of work was satisfactory.

The construction of the dry well was completed by the year-end and the superstructure of the pumphouse was 80% complete. The progress of work was slowed because of the steel strike in the U.S. The job was not expected to be completed before April, 1960.

Leamington (58-S-26)

Description of Project: Storm sewer
Consulting Engineer: C.G. Russell Armstrong, Windsor
Expected Completion Date: January, 1960
Estimated Cost: \$85,855

Quicksand and high water tables caused many delays and diffi-

culties.

Leamington (58-W-23)

Description of Project: Extension of existing Sherk Street
watermain

Consulting Engineer: C.G.Russell Armstrong, Windsor

Completed: October, 1959

Estimated Cost: \$22,234

This project could not be completed as planned since the town failed to obtain the necessary easements. Approximately 25% of the project had to be deleted, but the rest was satisfactorily completed.

Listowel (58-S-25)

Description of Project: Contract 'A' - Sanitary sewers
Contract 'B' - Lagoon and forcemain

Consulting Engineer: Proctor & Redfern, Toronto

Expected Completion Date: Contract 'A' - May, 1960
Contract 'B' - February, 1960

Estimated Cost: \$448,400

Work under Contract 'A' was more than three months behind schedule. Service connections were 75% complete by the end of the year.

Construction under Contract 'B' was progressing on schedule and was to be completed in February, 1960.

London Township (58-S-27)

Description of Project: North End sewage treatment plant with
an initial capacity of 2 m.g.d.--acti-
vated sludge type, with sludge filter-
ing equipment.

Consulting Engineer: R.C.Dunn & Associates, Ltd., London

Expected Completion Date: July, 1960

Estimated Cost: \$922,880

By the end of the year, settling, aeration and final tanks had been constructed. The foundations for the main control building and pump station were under way.

McKim Township (59-S-41)

Description of Project: Sanitary sewers, forcemain and pumping
stations

Consulting Engineer: OWRC
Expected Completion Date: March, 1960
Estimated Cost: \$262,900

The sewer project for the Lockerby District was prepared by the township engineering office except for the pumping stations which were designed by E.M. Powell & Associates, Sudbury, consulting engineers.

The Construction Division introduced the necessary changes and corrections and also prepared the specifications. The design of the pumping stations turned out to be both too expensive and inadequate and were rejected. Package sewage pumping stations were adopted and plans and specifications for these were prepared by H.A. Babcock and Company, Ltd., Toronto.

The total estimate as prepared by the McKim engineering office and submitted with their application was approximately \$315,000. The estimate prepared by the Construction Division was approximately \$262,900, a saving of \$53,100.

Construction started in October and the delay was mostly due to difficult ground conditions and early lack of proper organization on the part of the contractor. It was decided that the Construction Division would be directly responsible for the construction of the pumping stations as the prices submitted by all tenderers were considered too high.

Maidstone Township (59-W-31)

Description of Project: Extension of existing water system
Consulting Engineer: C.G.Russell Armstrong, Windsor
Completed: November, 1959
Estimated Cost: \$217,239

The work on this watermain was completed satisfactorily by the end of the year.

Markham Township (57-W-1)

Description of Project: Water works system
Consulting Engineer: H.A.Babcock & Company, Ltd., Toronto
Completed: Reservoir and Pumphouse - February, 1959
Distribution Mains - June, 1959
Estimated Cost: \$506,979

This project comprised the construction of a water supply and distribution system for the southwestern part of the Township of Markham

consisting of the installation of 40,000 feet of six, eight, 10 and 12-inch watermain and appurtenances and the building of and equipping of the 100,000 gal. reservoir and pumphouses.

With the project being completed well within the approved expenditure, the township requested that the auxiliary engine for the deep well pump be installed. This was done.

Markham Village (57-W-16)

Description of Project:	Wellhouse and trunk main
Consulting Engineer:	R.V.Anderson & Associates, Ltd., Toronto
Completed:	August 31, 1959
Estimated Cost:	\$46,744

This project comprised the construction of a well house, well pump, auxiliary engine, and 2,400 lineal feet of 12-inch asbestos cement trunk watermain. In April it was apparent that Manganaro Bros. Ltd., were unable to complete the remaining work under this contract amounting to \$1,450. Part of this was electrical work, which prevented completion of other contracts for installation of equipment. Manganaro's bonding company took over the responsibility of completing the contract.

Some difficulty was encountered with surging in the pipeline on shut down of the pump. This was overcome by closing the Clayton valve by means of a solenoid control.

Additional control equipment had to be installed to transmit the pressure signal from the elevated tank to the pumphouse during the hydro failure. Without this equipment the auxiliary engine would operate during power failure but would not shut off and consequently would overflow the elevated water tank. The installation of this equipment had not been completed by the end of the year.

Markham Village (59-S-40)

Description of Project:	Sewerage system including treatment plant
Consulting Engineer:	R.V.Anderson & Associates, Ltd., Toronto
Expected Completion Date:	Contract 'A' sewers - September, 1960 Contract 'B' plant - August, 1960
Estimated Cost:	\$567,100

This project comprised the construction of a sewerage system in the old portion of the village, a trunk sewer to the plant and a sewage treatment plant adjacent to the Rouge River to the southeast of the village.

Construction of the sewers was progressing satisfactorily at the year-end.

Work on the sewage treatment plant was commenced in August. All concrete work for the digester has been completed and the structure was temporarily enclosed to permit brick work to be carried out. Approximately 75% of the concrete work had been completed for the settling tanks, aeration tanks and control building foundations by the year-end. The control building area also temporarily enclosed to permit work to be carried on during cold weather.

Meaford (59-W-29)

Description of Project:	Contract 'A' - Laying of a gravity intake 800 feet into Georgian Bay and the construction of an intake well Contract 'B' - 5,800 feet of 16-inch trunk watermain and 400 feet of 36-inch storm sewer Contract 'C' - Construction of water pumping station, rapid sand filtration plant and a masonry superstructure for an intake well Contract 'D' - Installation of piping, electrical, filtration and control equipment
Consulting Engineer:	Philips and Roberts Ltd., Brantford
Completed:	Contracts 'A' and 'B' - October, 1959
Expected Completion Date:	Contract 'C' - September, 1960 Contract 'D' - Not known
Estimated Cost:	\$443,630

Work commenced on June 1st on Contracts 'A' and 'B' and were completed on schedule.

About 60% of the concrete work was completed on Contract 'C' but operations were to be suspended early in the new year with resumption in the spring.

In order to improve the supply of water in Meaford prior to the completion of the filtration plant it was agreed that the pumps would be installed at the intake and that chlorinated water would be pumped through the new 16-inch main. This was to be effected by connecting the intake and discharge pipes at the partially completed plant. It was expected that this temporary service would be in operation by mid-February, 1960.

Midland (59-W-49)

Description of Project:	Addition to water works system
Consulting Engineer:	R.V. Anderson & Associates, Ltd., Toronto
Expected Completion Date:	March, 1960
Estimated Cost:	\$46,448

During 1959 approximately 6,100 lineal feet of 10-inch cast iron watermain and appurtenances were added to the Midland water system to service a new subdivision. The project was completed except for the final grading and clean up.

Mitchell (59-W-42)

Description of Project: Addition to water works system
Consulting Engineer: OWRC
Expected Completion Date: November, 1960
Estimated Cost: \$107,241

The Mitchell P.U.C. was installing additional eight and 6-inch cast iron watermain and appurtenances with treatment plant, in three stages, to service established sections of the town. Stages #1 and #2 were 75% complete at the year-end. Stage #3, installation of the treatment plant, was to be started by April 15, 1960.

Mitchell (59-S-29)

Description of Project: Stage #1 - Storm sewers
Stage #2 - Sanitary sewage system
Consulting Engineer: R.M. Dawson, Stratford
Expected Completion Date: April, 1960
Estimated Cost: \$290,938

The sewer system was to consist of stage #1, storm sewers and stage #2, sanitary sewage system. Stage #1 was complete except for the final grading and clean-up. Stage #2 was under design.

Nepean Township (59-S-35)

Description of Project: Collector sewer and treatment plant
Consulting Engineer: Collector sewer - J.A. Chalmers,
Ottawa
Plant - Beaco Limited, Toronto
Expected Completion Date: Not known

This project comprised the construction of a collector sewer in the Township of Nepean starting at Merrivale Road, running westerly adjacent to the Canadian National Railways property to Bell's Corners, then across open farmland to the sewage treatment plant site on Watts Creek near Shirley's Bay, and a sewage treatment plant in the Shirley's Bay area.

Construction was expected to start in January, 1960, while treatment plant plans were being prepared.

North Bay (58-S-10)

Description of Project: Integrated sewerage scheme including North Bay, and the townships of West Ferris and Widdifield

Consulting Engineer: Graham Reid & Associates, Ltd., Toronto

Expected Completion Date: Contract 'A' Sewage treatment plant - July, 1960
Contract 'D' Sewers, West Ferris - May, 1960

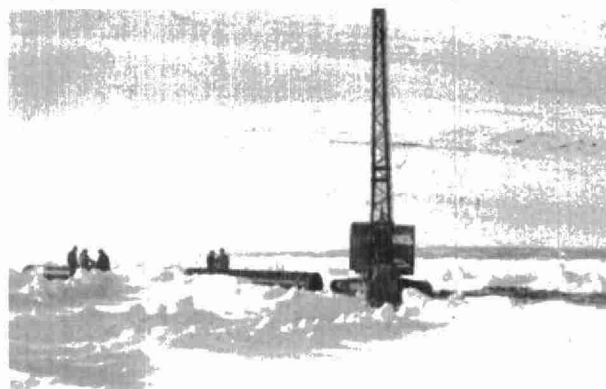
Completed: Contract 'B' Sewers - July, 1959
Contract 'C' Sewers - July, 1959

Estimated Cost: \$2,175,530

This project comprised the construction of a sewage treatment plant and trunk sewer collector system as a combined system for the municipalities of the City of North Bay and the townships of West Ferris and Widdifield.

This project was divided into four contracts as follows:

Plant - the site was at the mouth of Chippewa Creek in North Bay. Diversion of a portion of Chippewa Creek was completed in June, followed by site clearing. Excavation, pile driving for the settling tanks, aeration tanks, and detritor building, and rock excavation for the digester tanks were completed by the end of August.



WINTER WORK ON OUTFALL SEWER IN NORTHERN ONTARIO

Concrete work for the control building, aeration tanks, primary and final settling tanks, pipe gallery and digesters was substantially completed by the end of the year. Excavation of the steel for the dome of the primary digester was completed and block work for the digester control building was started.

Sewers, North Bay, Oak and Railway streets trunk - the contracting company returned to work in May after closing down for the winter, and completed the construction of the sewers on Oak Street and Regina Street in June. Some road reinstatement and clean up was completed in July.

Sewers, North Bay from plant to Judges Avenue - construction started early in June, and this section was substantially completed by July 15th and service connections completed by July 30th.

Sewers, West Ferris from Judges Avenue to Premier Road - Official starting date was June 1st, 1959, but work was permitted on Lakeshore Drive (Highway 11B) during June, July or August due to the large number of tourist establishments on this road.

Well points were used for the most part of this contract to lower the water table. The contractor made several attempts to use trenching machines on this work but the method was unsatisfactory for the depths on this section. Due to these attempts progress at the start of the job was slow. The project was approximately 40% complete by the end of the year. Construction was to continue through the winter under the Winter Works Incentive Program.

Orangeville (58-S-16)

Description of Project: Extension to sewage treatment plant
Consulting Engineer: Proctor & Redfern, Toronto
Expected Completion Date: February, 1960
Estimated Cost: \$165,860

This project was to consist of a pumphouse, grit removal chamber, primary clarifier, divisional chamber, chlorine contact tank, outfall and the restoration of the existing plant.

Orangeville (58-W-20)

Description of Project: Addition to water works system
Consulting Engineer: Proctor & Redfern, Toronto
Expected Completion Date: April, 1960
Estimated Cost: \$72,500

The addition to the town's water system of a pumphouse and the enlarging of the existing reservoir, was started on October 31st.

Port Arthur (58-S-13)

Description of Project: Contract 'A' - Trunk sewers
Contract 'B' - Sewage treatment plant
(primary treatment, including digester)
Consulting Engineer: R.V. Anderson & Associates, Ltd.,
Toronto
Completed: Contract 'A' - July, 1959
Contract 'B' - December, 1959
Estimated Cost: \$2,168,791

Work continued on Contract 'A' throughout the winter but difficulties were encountered in tunnelling under the C.N.R. main line owing to the nature of the clay and the contractor had to engage the services of a firm specializing in soil stabilization by chemical injection.

The workmanship on this contract was good.

Progress under Contract 'B' on construction of the lift station by the drop-caisson method was slow and the plant was not ready to be put into operation until December. The Commission took over the operation December 19th and by the end of the year the contractor had rectified most of the outstanding deficiencies.

Preston (58-W-22)

Description of Project:	Preliminary Contract - Development and construction of 10-inch diameter well having a total depth of 263 feet Contract 'A' - 5,000 feet of 16-inch watermain Contract 'B' - Construction of deep well pumphouse and supply of equipment Contract 'C' - Construction of 1.5 million-gallon storage reservoir
Consulting Engineer:	Proctor & Redfern, Toronto
Completed:	Preliminary Contract - May, 1959 Contracts 'A' and 'B' - October, 1959
Expected Completion Date:	Contract 'C' - June, 1960
Estimated Cost:	\$266,910

All contracts were completed in 1959 except the storage reservoir which was to be of pre-stressed concrete construction. Work on this will re-commence in the spring, following a winter shutdown.

Stayner (58-W-24)

Description of Project:	Drill and develop a 200 Imp. g.p.m. well, pumphouse and watermain
Consulting Engineer:	OWRC
Completed:	October, 1959
Estimated Cost:	\$60,272

This project was designed by the OWRC and the work was carried out by the Stayner Public Utilities Commission forces following drilling development of the well and the installation of the pump.

The project consisted of installation of 6,600 feet of 6-inch diameter asbestos-cement watermain, a 4-inch by-pass around the reservoir meter and building a 12-foot by 12-foot brick pumphouse. The watermain was laid out to service an additional section of the town and connected into the existing watermain at Main Street. Houses not previously serviced were to be connected to the system during the summer of 1960. The operation of the pump is controlled by a float switch and telemetering transmitter at the reservoir.

Stirling (58-S-18)

Description of Project:	Sewerage system, with lagoon
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Consulting Engineer: Hisey and Barrington, Richmond Hill
Expected Completion Date: February, 1960
Estimated Cost: \$222,267

This project comprised sanitary sewers in the village, three pumping stations and a 14-acre, two-section lagoon located to the south of the village.

Clearing of the lagoon was started in March and sewer construction was started in April. Progress was slow and on June 2nd, the contractor, Sherk Construction Company, registered voluntary bankruptcy. Meetings were held with the bonding company and the Trustee-in-Bankruptcy and it was decided to call tenders for completion of the work.

A new contract was awarded and work resumed July 20th. Progress on sewer installation was good. Work on the lagoon was slow and with a wet fall only one section was ready for operation before frost stopped further work on the remaining section. The contractor found conditions very difficult in the areas adjacent to the creek on Henry and Robert streets. With only 60 feet of sewer remaining near the pumping station, an old stream bed was encountered and the contractor was unable to keep ahead of the water with pumps and well points. Steel sheet piling was being brought in to cut off the flow of underground water. This delayed the completion of the project until February.

The sewers constructed by Sherk had to be cleaned out and a considerable amount had to be reconstructed due to breakages in the pipe and misalignment. Some road work was to be carried out in the spring after the frost is out of the ground.

Stratford (59-S-32)

Description of Project: 5,000 feet of sanitary sewer
Consulting Engineer: R.K. Brown, City Engineer, Stratford
Completed: August, 1959
Estimated Cost: \$84,901

This main serves the west end of Stratford and passes through an area which is not yet fully developed.

Trafalgar Township (59-W-32)

Description of Project: Contract #1 - 1,400 feet trunk watermain on Rebecca Street in the town of Oakville
Contract #2 - 6,325 feet watermain on Rebecca Street, Township of Trafalgar
Consulting Engineer: Contract #1 - Philips & Roberts Ltd., Brantford

Contract #2 - G.N. Briscoe, Township Engineer, Trafalgar

Completed: Contract #1 - July, 1959
Contract #2 - August, 1959

Estimated Cost: \$211,766

One firm was awarded both contracts on this project. The main was put into service in August. The supply of water was from the filtration plant in Oakville and provided a much-needed increase in the quantity of water available in the west end of the township.

Trafalgar (59-S-38)

Description of Project: 5,100 feet of 42 to 72-inch storm sewer

Consulting Engineer: Franklin McArthur & Associates, Ltd., Downsview

Completed: December, 1959

Estimated Cost: \$257,673

The sewer was laid on Rebecca Street starting at the Third Line and discharging into Fourteen Mile Creek.

Trenton (57-S-4)

Description of Project: Sewage treatment plant (primary with digesters) connecting sewers, sewage pumping stations and forcemain

Consulting Engineer: Gore & Storrie, Toronto

Expected Completion Date: January, 1960

Estimated Cost: \$512,320

The main contracts were awarded early in the year and work commenced on the outlet sewer and the sewer across the Trent River in February. Excavation for the treatment plant was started at the beginning of March. Progress was reasonably good at first but then slowed down so that the October completion dates for the pumping station and treatment plant were not attained. Owing to a number of deficiencies at both these locations, the treatment plant was not in operation by the end of the year.

Waterloo (58-S-22)

Description of Project: Extension to existing sewage treatment plant

Consulting Engineer: Procter & Redfern, Toronto

Expected Completion Date: March, 1960

Estimated Cost: \$672,188

The work was progressing satisfactorily and of good quality.

Westminster Township (59-S-33)

Description of Project: Contract #1 - Sewage treatment plant
(modified activated sludge)
Contract #2 - Sewers

Consulting Engineer: S.G. Chipman, Ltd., London

Completed: Plant - November, 1959
Sewers - September, 1959

Estimated Cost: \$253,230

The sewage plant was constructed without incident in the time allotted. The contractor started work on the various tanks before starting control house. This resulted in the mechanical and



AERATION TANKS AND MAIN CONTROL BUILDING OF OHRC-BUILT SEWAGE TREATMENT PLANT NEARING COMPLETION

electrical contractors expediting their work to meet the deadline.

The sewers were constructed without any difficulty. The contractor encountered hard clay throughout the job but there was no water problem. The job was held up a couple of weeks by the tunnel contractor who was flooded out on two or three occasions when the area received very heavy rains. Other than this the job was without incident.

Warton (58-S-21)

Description of Project: Sewage treatment works

Consulting Engineer: Hisey & Barrington, Richmond Hill

Expected Completion Date: April, 1960

Estimated Cost: \$118,900

This project involved the construction of gravity sewers, pumphouse, pressure mains, stabilization lagoon and outfall.

Winchester (57-W-9)

Description of Project: Waterworks system

Consulting Engineer: J.L.Richards & Associates, Ltd., Ottawa

Completed: September, 1959

Estimated Cost: \$269,516

This project comprised two wells and wellhouses, a 150,000 U.S. gallon elevated steel tank and a system of distribution mains.

The contract for the two wellhouses, tank foundations and distribution mains was started late in April and substantially completed by the end of August.

The contract for the elevated tank was completed on August 26th. The system was placed in operation in September.

LABORATORIES AND RESEARCH DIVISION

F.A. Voegel, Assistant Director

During 1959 this division experienced a beginning and a completion of certain activities in the field of laboratory work in water, sewage and industrial wastes. The beginning was symbolized by the laying of the cornerstone in the Commission's new laboratory in Etobicoke Township, while A.V. DeLaPorte's retirement from the Commission as Director of this division signalled the completion of his association within the Provincial ranks with this field of endeavor.

While awaiting the move to the new laboratory, the division operated from the temporary quarters obtained in the spring of 1958. Although the accommodation was sufficient to meet some of the needs of the various branches more space and better equipment in the new laboratory would allow more routine, specialized and research work to be carried out.

Although space for the various branches was cramped the total number of analyses performed by the chemical and bacteriological sections was much greater than that of preceding years. This was done although the number of employees in the chemical section remained almost static due to difficulty in obtaining suitable personnel. Similarly, the Industrial Wastes Branch increased the number of investigations and surveys with fewer men.

In an effort to make certain that the new laboratory would have up-to-date equipment and facilities consistent with economical cost, operation and maintenance, the division staff devoted hundreds of necessary man-hours to checking architectural and shop drawings, conferring with equipment suppliers, checking the specifications of this equipment and making lists of other equipment which will be needed in the new building.

Bacteriological Branch

The work load in 1959 increased approximately fourfold since the formation of the Commission. However, the erratic rate at which samples were received posed a serious problem. Table I and Graph I show the increase in the routine analytical work during 1959 compared to that of past years. A second chart, Graph II gives a breakdown of the weekly number of samples received over the past year.

During one week as many as 256 water samples alone were submitted while in the following week the laboratory received only 84. This wide fluctuation in the submission of samples is part of the cause necessitating overtime. Attempts at reducing this turbulent flow of samples was to be made early in 1960 when meetings were scheduled with those concerned in submitting regular samples. Histogram I gives a monthly comparison of the total number of routine samples received in 1958 and 1959. Fewer samples were submitted in the first four months of the year, while in the remaining eight months, in general, a greater number per month were received.

HISTOGRAM 1

**COMPARISON OF NUMBERS OF
MONTHLY SAMPLES RECEIVED
IN 1958 + 1959**

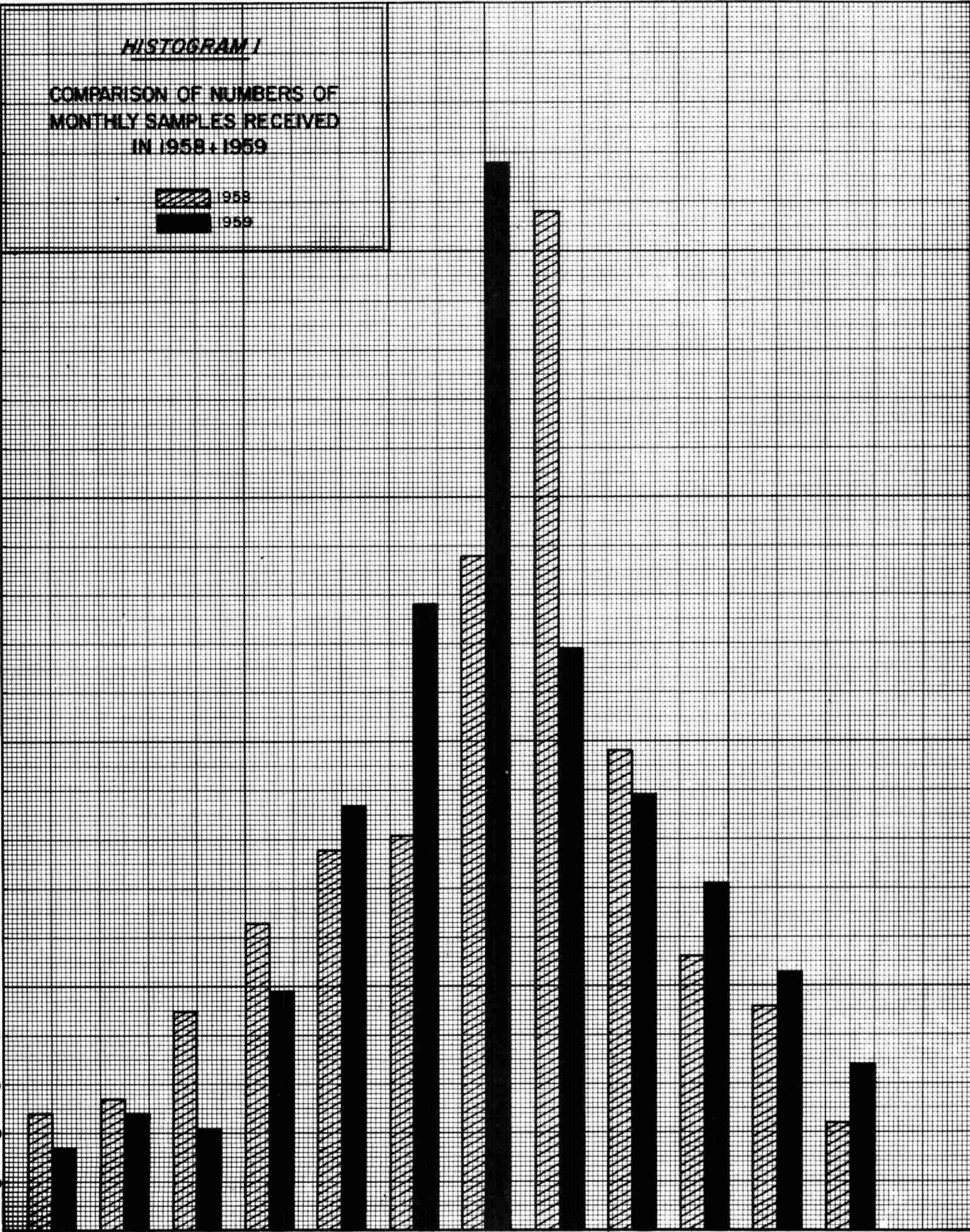
1958
1959

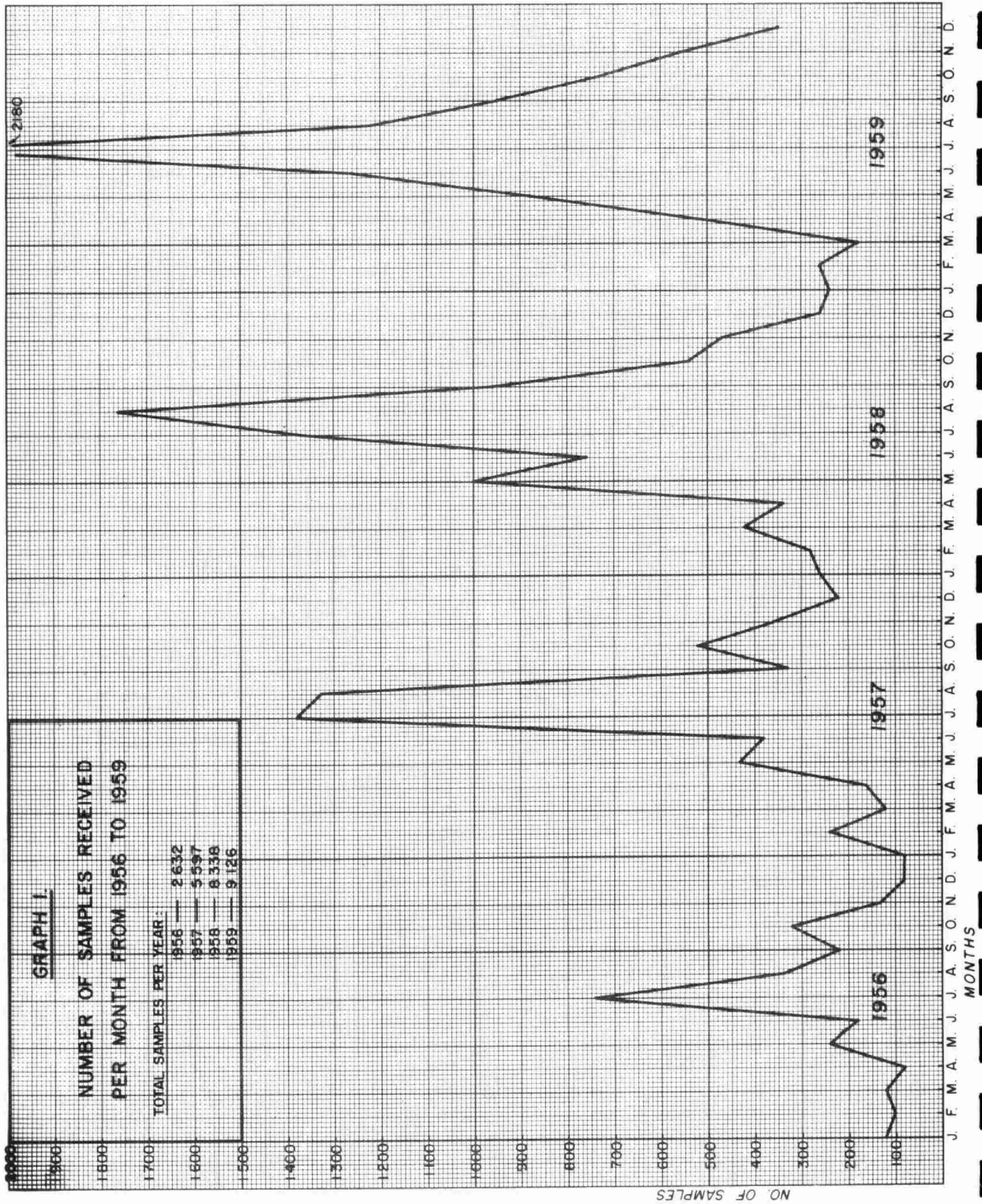
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0

NO. OF SAMPLES

J. F. M. A. M. J. J. A. S. O. N. D.

MONTHS





GRAPH II.

TOTAL WEEKLY SAMPLES
RECEIVED IN 1959

NO. OF WEEKLY SAMPLES ———
AVERAGE OF 4 WEEKS - - -

NO OF SAMPLES

560

520

480

440

400

360

320

280

240

200

160

120

80

40

0

858

J.

F.

M.

A.

M.

J.

J.

A.

S.

O.

N.

D.

MONTHS

TABLE I

Total Samples - 1959
Bacteriological Branch

<u>Month</u>	<u>Toronto</u>	<u>Sarnia</u>	<u>Monthly Total</u>
January	176		176
February	240		240
March	209		209
April	496		496
May	868		868
June	1,064	222	1,286
July	1,370	818	2,188
August	946	251	1,197
September	887		887
October	705		705
November	529		529
December	345		345
Total	<u>7,835</u>	<u>1,291</u>	<u>9,126</u>

One hundred and fifty-four samples, collected from 50 locations having bio-fouling problems, were submitted for examination in 1959. Though most of these involved the growth of iron bacteria in mains and reservoirs, odor-producing organisms such as sulphide-producing bacteria and actinomyces as well as problems due to the presence of molds and high bacterial numbers were presented. Detailed reports on the problems at Belleville, Brantford, Newmarket and Winchester were prepared following investigations by branch personnel.

Following a series of parallel experiments conducted on the routine sewage samples, it was found that most of these could be analyzed by the Membrane Filter as well as by the Indicated Number procedures. In view of the more precise, more truly representative result obtained from the Membrane Filter method of enumerating coliform, and in view of the results of the preliminary experiments, it was decided to begin analyzing sewage by the Membrane Filter technique.

Methods of culturing various iron and sulphur organisms continued, though progress was slow due to lack of information on physiological and morphological characteristics of these organisms.

A paper entitled "Some Biological Aspects of Water Quality" was presented by Supervisor L.T. Vlassoff to the Water Section of the Technical Association of the Pulp and Paper Industry at its annual convention.

Biology Branch

The chief duties of the Biology Branch during 1959 involved, as usual, survey work and applied research. However, the educational aspects, consultative services and administrative requirements demanded increasingly more time.

The largest single project undertaken during the year was an investigation into the problems caused by the algae Cladophora in Lake

Ontario. Professor D.A. McLarty, of the University of Western Ontario, was employed to carry out the field work, and the investigation included a study of the environment which led to the development of this nuisance and an evaluation of all the chemicals used for algae control. As a direct result of this work one chemical proved effective and some control might be possible in 1960.

A study directed to both control and the provision of basic data was started on the Avon River. Biological and chemical information to provide a background for this study was available and further investigations were to be made to determine the cause of the detrimental effects of sewage effluents on life in streams. A second problem relating to difficulties in water filtration caused by seasonal changes in the numbers and distribution of planktonic algae was also under investigation. The Biology Branch co-operated with the Purification Processes Branch on studies relating to the micro-straining of sewage effluents and the treatment of tannery wastes in oxidation ponds.

Apart from studies of a research nature reports on such matters as pollution at Sudbury and Bridgeport, taste and odor problems at Trenton and Port Dover and nuisances caused by fish and aquatic plants in Georgian Bay, Lake Huron and inland waters were investigated and reported on.

An increasing interest was shown in the biological aspects of the work of the Commission. This was indicated by the lectures and courses provided to the Workshop of Hunters and Anglers Association; Conservation Officers School, Department of Lands & Forests; Regional Health Conference; M.A.Sc. students, University of Toronto; and graduate students of the Fish and Wildlife Course, Ontario Agricultural College. One formal paper on the treatment of sewage in oxidation ponds was presented.

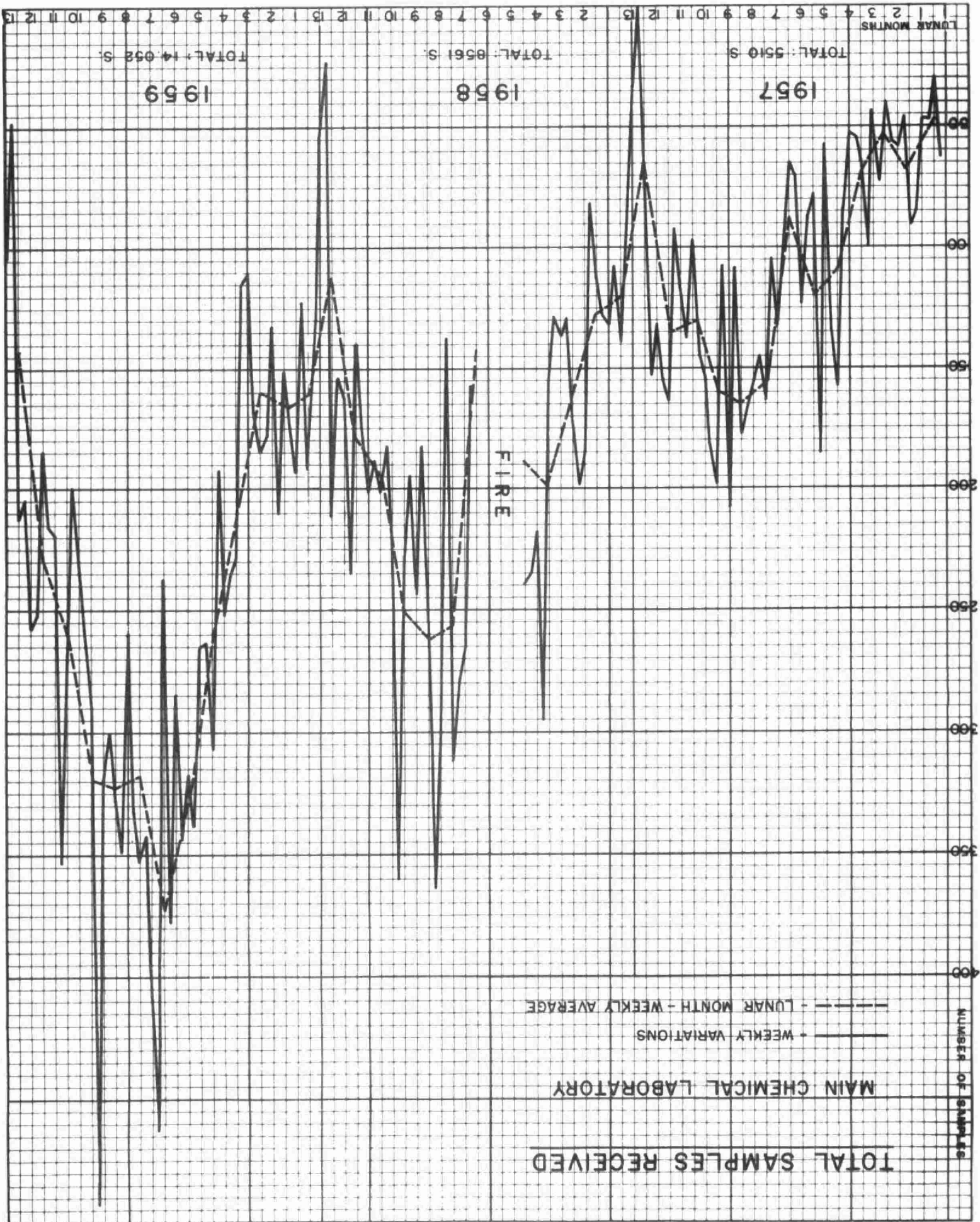
The supervisor, J.H. Neil, represented the Commission at conferences on biology, waste treatment and Great Lakes research.

Facilities to be provided by the new laboratory will permit the investigation of new and better methods of water and waste treatment and facilitate studies leading to a better understanding of the effect of polluting substances on life in water.

Chemical Branch

The most time-consuming tasks during the year concerned the new laboratory. They included discussions, checking and correction of detailed laboratory interior plans and specifications with consultants, architects, the Department of Public Works, various laboratory suppliers and finally with the successful bidders on the tenders. Experience gained in setting up the laboratory in its present temporary quarters, notably the opportunity to test bench layouts designed to facilitate the efficient processing of large numbers of routine samples, allowed modification of original designs while still on the drawing board.

While extensive assessment and revision of analytical methods presently in use in the chemical laboratories still awaits the acquisition of necessary equipment and space in the new laboratory building as well as additions to the staff, some analytical methods development and



SEWAGE SAMPLES RECEIVED

WEEKLY VARIATIONS
LUNAR MONTH -
WEEKLY AVERAGE

MAIN CHEMICAL LABORATORY

NUMBER OF SAMPLES

NUMBER OF SAMPLES

FIRE

1957

1958

1959

TOTAL = 2862 SAMPLES

TOTAL = 4285 SAMPLES

TOTAL = 6308 SAMPLES

1 2 3 4 5 6 7 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13

LUNAR MONTHS

208

226

200

instrument evaluation was accomplished during the year. New determinations tested by extended trial and adopted for use include methods for lead, copper, phosphate and total Kjeldahl nitrogen. In general, the new techniques while yielding greater sensitivity and freedom from interference, required greater skill and care on the part of the analyst, and were definitely more time-consuming.

Instruments tested and found valuable included the pontentiometric determination of acidity and alkalinity end points, an automatic fluoride distillation unit, and two varieties of micro Kjeldahl apparatus which were judged to have special merit, one, in obtaining more precise results, the other, for field use due to its simplified service requirements.

Forms carefully developed to accompany incoming samples from the sender were designed to aid in processing ever-increasing numbers of samples rapidly through sample reception to the laboratories proper. However, the forms met with only limited success and samples arriving with inadequately detailed and organized information were a mitigated but continuing problem. Revision of the forms, training of selected sample reception and clerical personnel, together with the increased experience of field staff in handling and organizing large groups of samples were expected to minimize these difficulties in the ensuing year.

A marked increase in the production of the chemical laboratory was obtained again this year, despite the fact that only one of the planned additions to the staff was acquired by the year's end. Intensive efforts to fill these positions were underway.

Field work was limited this year to the operation of the Sarnia laboratory for two months. The results of repetitive daily monitoring of samples taken from the length of the St. Clair River for both organic and toxic metal pollution were compiled in a report submitted to the International Joint Commission, under whose sponsorship the survey was performed.

In the main chemical laboratory, an increase of 53% over the previous year's totals of samples and individual determinations was achieved. The decreased amount of field work modified to 25% the overall increase in total number of samples and determinations handled.

Progress charts illustrating yearly increases in samples processed during the last three years are included in this report. In addition to demonstrating the rapid multiplication of laboratory work, the pronounced weekly variations in sample numbers should be noted, particularly among sewage samples, which, including as they do regular weekly and monthly samples from sewage plants throughout Ontario, would be expected to show some stability from week to week.

TABLE II

<u>Laboratory</u>	<u>Month</u>	<u>Total Samples - 1959</u> <u>Chemical Branch</u>	
		<u>No. of samples</u> <u>received</u>	<u>No. of analyses</u> <u>performed</u>
Toronto	January	640	3,041

TABLE II (Cont.)

<u>Laboratory</u>	<u>Month</u>	<u>No. of samples received</u>	<u>No. of analysis performed</u>
Toronto (cont.)	February	672	3,064
	March	657	3,021
	April	857	4,034
	May	1,225	5,312
	June	1,390	6,676
	July	1,838	8,125
	August	1,328	6,244
	September	1,472	7,222
	October	1,196	5,359
	November	904	4,194
	December	714	3,493
Total		12,893	59,785
Sarnia	July	814	1,836
	August	370	513
Total		1,184	2,349
TOTAL FOR THE YEAR		14,077	62,134

Industrial Wastes Branch

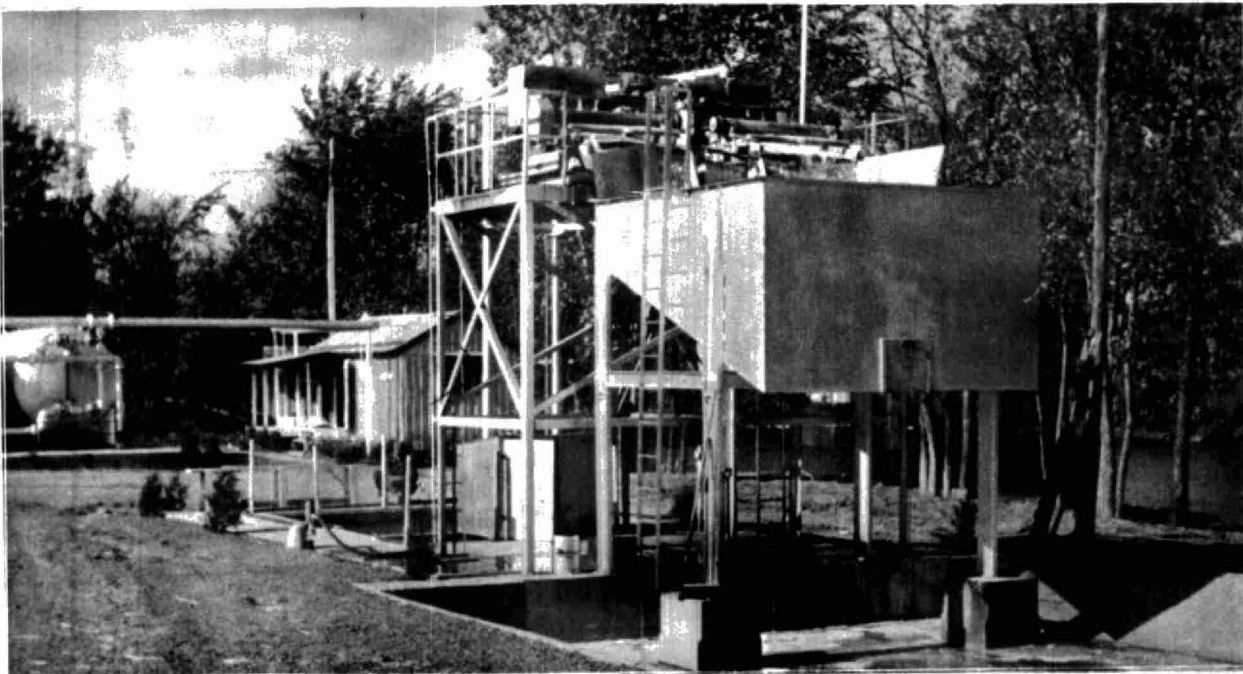
Approximately 450 industrial waste investigations and examinations were made during the year, as the study of the abatement of pollution and control of sewage plant loading from industrial sources was intensified. Of special significance was the growing acceptance by industry of the responsibility for pollution control, as the attitude of industry toward the problem was largely changed from one of indifference to one of concern and active co-operation during the past few years.

The diversion of industrial wastes and sewage from the Old Welland Canal, above Thorold, to Gibson Lake in the headwaters of the De Cew Falls hydro-electric generating station became a matter of concern during the summer when pollution that resulted gave rise to complaints from local residents and organizations. The diversion, to last for a period of about one and one-half years, was made to permit alterations to the Thorold and Merritton sections of the Canal, and carried principally the wastes from a large newsprint mill and alcohol and vanillin plants associated with it. A study of the sources of wastes was undertaken to determine remedial measures that could be taken.

The problems at the Thorold mill, which remained essentially unsolved at the year-end, were similar to those of other pulp and paper mills throughout the Province. The impracticability of applying conventional waste treatment practices to an industrial waste problem of such magnitude pointed to the need for the development of a specific ap-

proach to suit the conditions under which the Ontario industry operates. A multiple approach including control, recovery, utilization, and treatment of wastes, may be required in some mills. The initiative of the industry in establishing area committees in the Niagara Peninsula and the Lakehead to explore means of proceeding with the study of the problem, indicated the concern that is felt within the industry.

The investigation of the disposal of uranium mining wastes in the Elliot Lake and Bancroft areas was to determine the effectiveness of waste-handling procedures set out in previous consultations with the industry. Ten mines in the Elliot Lake area, milling about 35,000 tons of ore per day, and three in the Bancroft area, milling about 4,500 tons per day, made up this program. Samples taken by personnel of the Elliot Lake mines at regular intervals throughout



SHAKER, OR VIBRATING, SCREEN USED EXTENSIVELY FOR PRE-TREATMENT OF CANNERY WASTES

most of the year served to permit an assessment of the need for control measures in that area. The problem was essentially one of settling and impounding the finely pulverized spent ore, or tailings, and suitable neutralizing the spent acid and controlling the concentration of metals in solution, to permit safe disposal of the liquid wastes to the surface waters. Lack of close supervision by the companies of impoundment areas, or indifference to the need for rigid waste control, led to undesirable conditions in some instances. On the whole, however, containment of the tailings was suitable, although there was always the threat of their spread to downstream waters should an impoundment fail.

A complete industrial waste survey was made in Welland County as part of the water resources and pollution survey undertaken by the Water Resources Division. A total of 165 industries, with a wide variety of processes and employing between 21,000 and 23,000 people, were found to use some 132,000,000 gallons of water per day, of which 12,000,000 gallons were supplied by municipal systems, the remainder by the industries themselves. It was noted that the 12,000,000 gal-

lons purchased from the municipalities represented about 52% of the total average volume of water pumped by the municipalities. The survey showed industrial wastes to be of importance in five areas - Thorold, Welland, Port Colborne, Niagara Falls and Stamford Township, and Fort Erie - and indicated where control of wastes should be improved.

A second such survey was begun in Haldimand County near the end of the year.

During 1959 four municipal industrial waste surveys were completed at Guelph, Pembroke, Peterborough and Woodstock involving a total of 100 firms. This type of survey was intended to serve as an aid in the design and operation of a municipal sewage treatment plant as well as to discover direct sources of industrial waste pollution. The report of one such survey, in which the field work was carried out in the final three months of the previous year, was prepared early in 1959 and involved some 400 pages in its final form. The time expended on these surveys was considered well spent since it was possible to publicize the objectives of the Commission among the industrial community in a defined area, and to provide a technical assessment of their problems on a uniform industry-wide basis.

Problems of waste disposal from the large industries in Fort William and Port Arthur were reviewed to discuss with management the findings and recommendations of a previous survey, and to seek means of controlling wastes in keeping with the program being undertaken by the Commission to provide treatment for municipal sanitary wastes.

Over 60 industries with metal-finishing wastes were visited during the year. There was favorable response in this industry to providing waste treatment or reducing the discharge of toxic substances. One such industry in Streetsville reduced the output of cyanide, copper and nickel to the sanitary sewer by 90%. Further improvements were contemplated by the company. Elimination of toxic plating wastes is vital to good operation at a sewage treatment plant. Another company with a history of stream pollution had installed a system of treatment ponds for neutralizing pickling wastes. Many companies employing metal-finishing processes were made aware of the pollution problem during the investigations for the Welland County survey and initiated waste treatment facilities.

The intermittent occurrence of taste-producing concentrations of phenols in the west end of Lake Ontario was investigated in an effort to locate specific sources and indicate where control of phenols should be improved. Phenol was shown to be mainly present in the deeper water layers, and that concentrations were higher, at times, in Lake Ontario than in Hamilton harbor.

The field work for the International Joint Commission on Pollution of Boundary Waters, carried out by the Industrial Wastes Branch, centered in the Sault Ste. Marie area. The program for 1959 involved an investigation of the water quality in the St. Marys River, and included river sampling above the Sault Ste. Marie water works intake. The findings of this survey in May resulted in a return visit in September for an intensive industrial waste investigation of the three large industries in the city of Sault Ste. Marie. The reports on these investi-

gations were to be presented for discussion at the next meeting of the Board of Technical Advisors to the International Joint Commission.

Purification Processes Branch

Much of the time during the year was used in training the new members of the staff in laboratory procedure, which training should prove invaluable in the new laboratory, when completed, and projects that have been planned go into operation.

No large research projects were carried out, but a number of smaller investigations were made at St. Mary's, Newmarket, Brantford, Markham Township, Parkhill, Dresden and Acton.

Some of these problems were solved while investigation continued in regard to others.

For instance, at Brantford, the Canada Packers cannery was having trouble with an off color in canned corn. This condition could have been caused by certain metals in the water supply. However, analysis showed the absence of these metals in the water. An inspection was made and it was suggested that the washer being used would be a source of heavy bacterial growth. As bacteria could also be the cause of the trouble it was planned to replace the washer in question. There was no report on the results of this change by the end of the year.

The township of Markham asked for help with regard to slime growths at the pumphouse. These had not reached the stage of causing a taste and odor problem but their appearance in the water was objectionable. Samples were taken and the work of identification was in progress at the year's end. When the analyses were completed a method of treatment was to be recommended.

The springs used as a water supply by the town of Acton revealed a large increase in the chloride content during the past three or four years and the point was reached where the quality of the water for domestic use was questionable. Tannery waste was being disposed of by spray irrigation on fields that were close to the spring area and this could have been the source of the high chlorides. To trace any possible flow from the irrigation fields to the springs fluorescein dye was spread on these fields, but to the end of the year the dye had not been detected in the water. It was estimated at the start of this test, however, that it might take six months for the dyes to travel to the springs.

Further research was carried out during the year on the use of anti-foam compounds for control of foam in sewage disposal plants. Anti-foam compounds used in the past have been excessively costly, but water sprayers were being used quite successfully. However, this method had one disadvantage in that it required a large volume of water. It was felt that a combination of these two methods might give a better answer to the problem. Two lines of sprays were installed at the North Toronto Sewage Disposal Plant; in one line, water only was used, in the other line, water, plus a small amount of anti-foam compounds. Using this equipment a number of compounds which had been recommended for foam control were evaluated. A report on this work was being prepared.

It was suggested in the past that dialysis could be used to recover chemicals from industrial waste. A small laboratory dializer was set up and some work was done on two wastes that were brought to the laboratory.

The first waste treated was brine from a pickle factory. It was thought that it would be possible to make a recovery of the salt, but it was found that it could not be separated in pure enough form to be re-usable.

The second waste was pickle liquor from a bolt and nut factory. This waste was from a batch process and was low in free acid, and did not respond to treatment. It was claimed that the waste from a continuous flow pickling tank that had a higher free acid content could be treated successfully and the free acid recovered. It was planned to do further tests with this type of waste.

The Strathcona Paper Company is now using a combination of lagoons and spray irrigation for treating its wastes, and is planning disposal of all wastes during warmer weather by spray irrigation. Lagoons were extended so that they would have a holding period of five and one-half days in the winter.

A study was made of two total oxidation sewage plants installed at a service station on Highway #400. These plants had not operated in a satisfactory manner since they were installed, and the trouble would appear to be in the loading. This type of plant would operate efficiently only with a fairly constant load. In these locations the loading was very heavy during the weekends and light during the rest of the week. Under these conditions it was impossible to keep the biological sludge in the proper condition.

The Regent Refinery at Port Credit was carrying out research on treatment of its phenol waste, using an "Aeroaccelerator". There were some good results for short periods but mechanical problems and foaming made continuous operation difficult.

A start was made on collecting information on radio-active waste. With the possible advent of atomic energy in Ontario, it was essential that the knowledge of how to handle the waste and possible accidental pollution from these plants be available.

PLANT OPERATIONS DIVISION

D.S. Caverly, Director

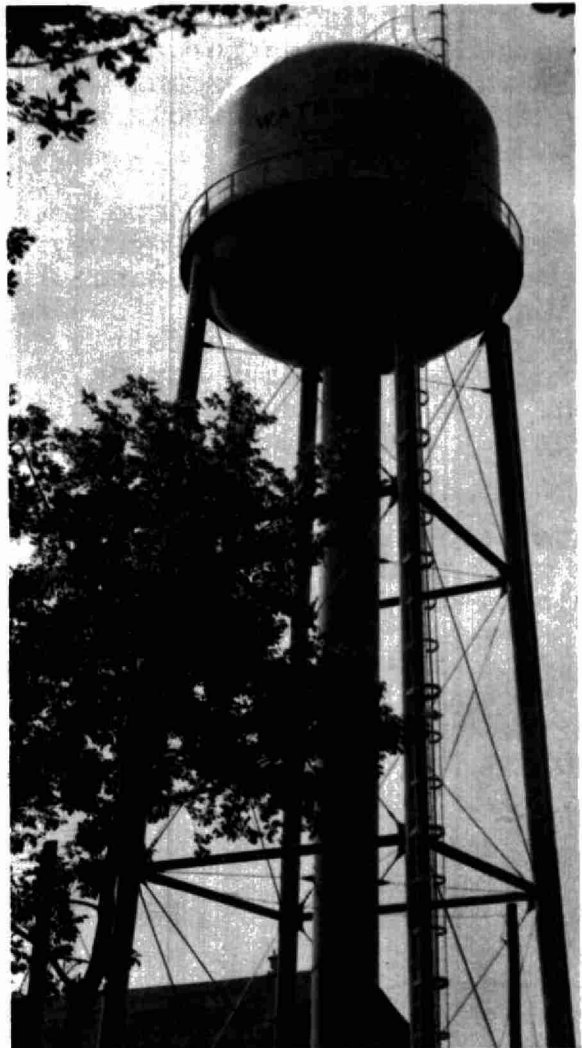
The Division of Plant Operations completed its second year of activity, and at the year-end was continuing its rapid expansion. Through this division, the OWRC is responsible for the management, operation and control of all projects which it constructs for municipalities.

By December 31, 1959, there were 21 water projects and 13 sewage works under the control of the division. This was an increase of 17 or 113% over the previous year. Head office staff increased to 14 and the plant operators employed by the OWRC totalled 30.

Division field engineers and technicians inspected all projects at regular intervals and gave technical assistance where required. Emergency equipment and supplies were maintained by the Division for use at any of the projects on short notice. Planned programs of sampling were carried out in co-operation with the Division of Laboratories and Research to maintain a high quality of water and satisfactory sewage plant effluents. A statistical section analyzed data submitted on a weekly basis from all projects with a view to improving efficiencies in operation and reducing costs.

Local Advisory Committees

The policy of using Local Advisory Committees to maintain a close liaison between OWRC and municipalities concerned was continued in 1959. While the OWRC is responsible for the management, operation and control of all projects which it constructs for municipalities, its policy is to work in close co-operation with the municipality, and preferably through such Local Advisory Committees.



WATER TOWER AT COMPLETED OWRC PROJECT

Most Committees which have been set up consist of the Mayor (or Reeve), Chairman of Board of Works (or Sewage and Sanitation Committee), Chairman of Finance Committee, Clerk (or Treasurer), Engineer, and a representative from the P.U.C. if part of the annual charges were to be collected on the water bill.

The Committees met regularly with representatives of the OWRC to discuss all matters relating to the projects concerned.

Projects taken over in 1959

Following is a summary of projects where construction was completed in 1959 and supervision transferred to the Operations Division.

In these instances Local Advisory Committees were established, operating staff engaged if required, and operating procedures established.

Alfred (58-W-14)

Renovation to the existing water distribution system and provision of a new supply works.

Bancroft (57-S-3)

Sanitary sewers, pumping station and treatment works, (primary treatment with chlorination of the effluent).

Belle River (59-W-30)

A feeder watermain leading to Maidstone Township.

Bolton (58-W-21)

A deep well and pumphouse to augment the present municipal supply.

Dresden (59-W-43)

Provision of extra pumps and piping to increase the supply works construction under 57-W-7.

Frankford (58-S-9)

A sanitary sewerage system consisting of sewers, pumping station and a trickling filter treatment plant with chlorination of the effluent.

Kitchener (58-W-18)

A reinforced concrete reservoir of 5.0 million gallon capacity.

Leamington (58-W-23)

A 12-inch watermain.

Markham Township (57-W-1)

A water works system for a portion of the Township of Markham consisting of two deep wells, distribution mains, two pumphouses and reservoir. New supply works for the municipal water system consisting of a deep well, pumphouse and feeder main.

Markham Village (58-W-16)

New supply works for the municipal water system consisting of a deep well, pumphouse and feeder main.

Maidstone Township (59-W-31)

Feeder mains and a booster station to augment the supply of water for certain parts of the township from the water works of the village of Belle River.

Port Arthur (58-S-31)

Storm and sanitary trunk sewers together with a sewage treatment plant, (primary treatment with heated sludge digestion and chlorination of the effluent).

Richmond Hill (57-W-11)

A feeder watermain and a steel elevated storage tank.

Stayner (58-W-24)

A deep well, pumphouse, and feeder main to augment the municipal supply.



TYPICAL SMALL OMRC PUMPHOUSE INSTALLATION

Stratford (59-S-32)

A sanitary trunk sewer leading to the treatment plant constructed under 57-S-2.

Trafalgar Township (59-W-32)

A feeder watermain.

Trafalgar Township (59-S-38)

A trunk storm sewer.

Westminster Township (59-S-33)

Sanitary trunk sewers and treatment works (activated sludge) to serve a portion of the township.

Winchester (57-W-9)

A water works system consisting of two deep wells, pumphouses, elevated storage tank and distribution mains.

SANITARY ENGINEERING DIVISION

G.M. Galimbert, Director

The efforts of the Sanitary Engineering Division are directed toward the objectives of the Commission in the provision of adequate water supplies and the protection of all water courses against pollution. The division is therefore concerned with many problems in these two fields that do not affect the rest of the Commission staff. In many instances this work falls within the scope that was formerly carried out by the Provincial Department of Health. In addition, the division takes a definite interest and an active participation in the water and sewer projects of the Commission.

There is a wide variety of work in the division, from discussions with consulting engineers on all water works and sewage projects and the study and approval of their plans in those fields to the inspection of water works and sewage plants, stream pollution and sanitary surveys, industrial waste investigations of cannery, milk-processing, gravel-washing and a variety of other industrial plants. In addition, the division takes an active part in the overall county and area surveys with the Surface and Ground Water branches of the Water Resources Division. There is also a Stream Sanitation Branch which assembles and correlates the information obtained from the river and pollution surveys. This section also has under its supervision the draughting room that prepares maps and drawings to complete the various reports.

Approval of Plans of Water and Sewage Projects

The approval of plans for the installation of water and sewage works projects for all municipalities in Ontario continues to be a major activity of the division. In this work discussions are held with consulting engineers by the water and sewage works supervisors prior to the completion of plans. Therefore, any changes can be effected at an early stage that either improve the treatment provided or minimize the cost. During 1959, 866 certificates were issued for water works installations calling for an expenditure of \$42,258,878.41, compared with 729 certificates in 1958 and an expenditure of \$39,224,132.67. For sewage works installations 1,109 certificates were issued calling for an expenditure of \$73,467,124.59, compared to 865 certificates calling for an expenditure of \$70,296,000.52 in 1958.

Increase in Work Noted

Total for the Province during the year was \$115,726,003.00, compared with \$109,520,133.19 in 1958. It is interesting to note that 63.7% of the work was in the field of sewers and sewage disposal. The final certificates on OWRC projects during the year called for an expenditure of \$13,914,067.01. The major program being carried out in Metro Toronto also was indicated in the issuance of 192 water works certificates calling for an expenditure of \$11,763,302.92 and 337 sewage works certificates calling for an expenditure of \$25,971,842.83.

Evaluation of Subdivisions Being Installed

An evaluation of the information provided on water supply, sewage

disposal and soil conditions in 1,155 subdivisions was made during the year. In addition, 42 plans of subdivisions area control were considered. This work was carried out at the request of the Community Planning Branch of the Department of Planning and Development and in some instances in co-operation with local Departments of Health.

District Work

Field work of the division is carried out under the supervision of the four District Engineers. In each instance the engineer covers a designated area in Southern Ontario and another in Northern Ontario. The routine work in the regular inspection of all the water and sewage plants, stream and sanitary surveys and industrial plants with organic wastes discharges. Many special investigations are made throughout the year. The district staffs were still actively engaged in carrying out county water resources and pollution surveys at the year-end.

Water Works Inspections

There were 241 inspections made by district staffs of water plants that have treatment divided into 183 municipal, 15 industrial, six military, seven institutional and 30 private supplies. In addition, 182 general inspections of water works were carried out of which 139 were municipal, 15 industrial, one military, four institutional and 23 private supplies. Samples totalling 1,014 were secured for bacteriological analyses and 326 for chemical determinations during these inspections.

Sewage Works Inspections

There were 295 sewage treatment plant inspections made during 1959 divided into 163 municipal, 45 industrial, 18 military, 26 institutional and 43 private plants. In addition, 194 sewerage, 490 industrial wastes and 54 drainage inspections were carried out. There were 889 samples obtained for bacteriological, 1,573 for chemical and 13 for special determinations during these inspections.

Stream Pollution Surveys

There were 161 stream pollution surveys and two algae and plankton investigations carried out. This work, on occasion, required considerable time, an example being the survey of the St. Lawrence River off Pittsburgh Township. This was a major work both from an inspection standpoint and in the preparation of the report. In this stream sanitation work 2,077 bacterial, 1,783 chemical and 27 other samples were obtained.

Meetings

A major activity of the district engineering staff were the meetings held with a great variety of municipal officials. During 1959 there were 1,126 meetings as follows--49 council, 252 municipal clerks, 227 other municipal officials, 159 public utilities commissions, 73 consulting engineers, 223 medical officers of health, and 143 miscellaneous. In these duties the district staffs were carrying out important public relations work on behalf of the Commission.

Stream Sanitation Section

Complete surveys were made on 25 different streams with repeats on four. Weekly surveys were carried out on the Avon River. Pollution investigations were made at 320 locations on 126 streams or lakes. There was definite evidence of improvement in conditions as a result of the efforts to eliminate pollution.

New sewage plants were completed or were under construction at Bancroft, Burlington, Brampton, Brantford, Consiton, Fergus, Frankford, Georgetown, Huntsville, Kitchener, London Township, Markham Village, North Bay, Orangeville, Port Arthur, Stratford, Streetsville, Richmond Hill, Trenton and Waterloo. Sewage lagoon installations were being made at Listowel, Sterling, and Wiarton. The installation of sewage disposal for Nepean Township, Paris, Point Edward, Sault Ste. Marie, Tillsonburg and Toronto Township (part) was planned for



OMRC FIELD MAN RUNNING AN ON-THE-SPOT DISSOLVED OXYGEN ANALYSIS

1960. There also were installations of sewage plants for five subdivisions and four institutions. In a number of municipalities, local officials have co-operated to eliminate illegal sewer and septic tank connections to municipal storm sewers. However, there still was much to be done by industry in regard to their waste discharges to sewerage systems.

Maps or drawings totalling 224 were completed in the draughting room in the following categories: watersheds 10; surveys 119; projects 72; charts 4; graphs, etc. 19.

Watershed maps were prepared for 51 streams showing selected sampling points with mileages for stream surveys. Card indexes of analyses reports of stream samples are kept up to date.

Approval of Plans of Water and Sewage Works

The checking of plans for all water and sewage works projects in

the Province, as usual, was carried out by the Sanitary Engineering Division. The summary and the itemized list of the certificates issued to each municipality during 1959 are listed below:

<u>Water Works</u>	<u>Estimated Cost</u>
Extensions to existing systems	\$35,813,274.17
Purification and water supply	6,102,249.77
New systems	<u>343,354.47</u>
Total	<u>\$42,258,878.41</u>

<u>Sewage Works</u>	
Extensions to existing systems	\$64,779,965.39
Treatment works	5,943,747.82
New sewerage systems	<u>2,743,411.38</u>
Total	<u>\$73,467,124.59</u>

The total number of applications favorably reported upon in the water works and sewage works fields for the year 1959 was 1,975 and involved an estimated expenditure of \$115,726,003. This can be compared with the 1,594 approvals and the estimated expenditure of \$109,520,133.19 in 1958.

Certificates Issued Re Water Works for the Year 1959

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$		\$
Ajax	1	20,000.00		
Alexandria	1	9,742.00		
Alfred	1	775.00		
Alliston	1	46,200.00		
Almonte	4	20,552.40		
Amherstburg	1	2,450.00		
Ancaster Twp.	3	296,405.00		
Anderdon Twp.	1	11,833.50		
Aurora	1	4,928.58		
Aurora(Sunnybrook In- vestments Ltd., Toronto).....	2	63,359.20		
Bancroft	2	21,281.00		
Barrie	15	329,546.64	100,500.00	
Bath	1	36,900.20		
Beeton	1	4,500.00		
Belle River	2	171,829.00	73,450.00	
Belleville	7	197,611.64		
Belleville(Lambert- Rollins Construction Limited).....	1	1,900.00		
Bertie Twp.	1		*644,000.00	

Water Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
<u>Bolton</u> (Dr. Thomas M. Walker, Toronto).....1		5,490.00		
Bowmanville 4		48,700.00		
Brampton 5		267,004.00	*267,000.00	
Brantford 5		254,173.28		
Bridgeport 1		1,055.00		
<u>Brock Twp.</u> (Police V. of Sunderland).....1		900.00		
Brockville 8		138,502.73	927,000.00	
<u>Brockville</u> (North Amer- can Construction, Kingston).....1		16,961.59		
<u>Burchell Lake Town- site</u> (Coldstream Copper Mines Ltd.)...1		29,895.00		
Burlington 14		366,331.66		
<u>Caldwell Twp.</u> (Police V. of Verner).....1			8,000.00	
Caledon East 1				75,000.00
Campbellford 2			*135,000.00	
Cannington 1		*71,000.00		
<u>Cedar Springs</u> (Ont. Dept. Public Works)...1			850,000.00	
<u>Charlotteville Twp.</u> (Mr. Chas. Booth, Simcoe).....1		7,913.50		
Chatham 10		148,528.17	100,000.00	
Chesley 2		3,696.00		
Chesterville 1				*282,115.00
Chinguacousy Twp. 4		644,794.90	45,000.00	
Chippawa 1		4,559.00		
<u>Clarence Twp.</u> (Police V. of Bourget).....1		9,000.00		
<u>Clarence Twp.</u> (Police V. of Clarence Creek)1		27,000.00		
Clinton 1		3,346.10		
<u>Clinton Twp.</u> (Mr. H.G. Humphrey, Beamsville).1		3,461.00		
Colchester S. Twp. 1		18,570.00		
Collingwood 1		250,000.00		
Coniston 1		21,400.00		
Cornwall 8		140,635.42		
Creemore 1		10,056.00		
Crowland Twp. 2		12,090.89		
Deep River 3		338,093.00		
Delhi 3		12,324.45	10,287.38	
<u>Dorchester N.Twp.</u> (Mr. E.P.Dignan, London)...1		3,170.00		
Dorchester S. Twp. 1		3,000.00		

Water Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>	
		\$	\$	\$	
Dresden	1	20,000.00			
Dryden	1	21,169.00			
Dundalk	1			*101,700.00	
Dunnville	4	3,021.00	2,089,400.00		
Durham	1	2,000.00			
Elliot Lake	1	70,800.00			
Elmvale	3	4,280.00	55,000.00		
Ernestown Twp. (Amwat Company, Ltd., Kings- ton).....	3	40,497.71			
Espanola	2	28,846.29		*464,089.00	
Etobicoke Twp.	48	1,241,712.64			
Exeter	4	13,494.23			
Ferris W. Twp.	1	*42,452.00			
Ferris W. Twp. (Mr. Samuel Herman).....	1	10,359.00			
Fonthill (Mr. H. Haist)	1	3,675.00			
Fort Erie	1	8,700.00			
Fort William	1	*340,600.00			
Frankford	1	647.35			
Galt	4	308,714.00			
Gananoque	1	8,530.00			
Georgetown	1	32,000.00			
Georgina Twp.	1	21,388.95			
Geraldton	1	40,000.00			
Geraldton (Northern Ont. Pipe Line Crown Corp. Ottawa).....	1		81,000.00		
Gosfield N. Twp.	6	276,248.00			
Gosfield S. Twp.	4	802,774.00			
Gloucester Twp. (Mr. G. E. McLean, Manotick).. <td><td>1</td><td></td><td>105,070.00</td><td></td></td>	<td>1</td> <td></td> <td>105,070.00</td> <td></td>	1		105,070.00	
Grantham Twp.	9	219,487.00			
Gravenhurst	1		55,100.00		
Grimsby	2	81,890.00			
Grimsby (Mr. R. Sexsmith)	1	5,601.00			
Grimsby (Mr. Kusmeider)	1	1,850.00			
Grimsby N. Twp.	6	58,972.90			
Grimsby N. Twp. (Mr. Brian W. B. Morison, Hamilton).....	1	11,000.00			
Guelph	1		17,950.00		
Guelph Twp.	2	9,400.00			
Gwillimbury East Twp.	2	34,649.00			
Gwillimbury E. Twp. (Police V. Sharon)....	1		16,500.00		
Hagersville	1	48,000.00			

Water Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	
Haileybury	1	*20,025.00		.
Hamilton	37	2,251,627.00		
Hastings	1			*139,100.00
Hearst	1	15,000.00		
Hespeler	2	21,510.00		
Humberstone Twp.	1	4,517.07		
<u>Humberstone Twp.</u> (Killaly Developments Ltd., Toronto).....1		76,243.20		
<u>Ignace(Northern Ontario Pipe Line Crown Corp. Ottawa).....1</u>			58,480.00	
Kapuskasing	1	13,000.00		
Kemptville	1	18,750.00		
Kenora	1	19,400.00		
<u>Kenora(Dept. of Citi- senship & Immigra- tion, Ottawa).....1</u>			44,480.00	
Kincardine	1	67,000.00		
<u>King Twp.(Police V. Schomberg).....1</u>				*91,143.00
King Twp.	1	8,900.00		
Kingston	8	56,851.34		
<u>Kingston(Kingscourt Realty Ltd.Kingston).1</u>		7,500.00		
Kingston Twp.	1		27,581.89	
Kingsville	1	5,248.00		
Kitchener	6	618,020.00		
Lakefield	3	85,136.56		
Leamington	6	35,271.52		
Leaside	2	89,800.00		
Lindsay	3	41,526.26		
Listowel	1		15,000.00	
London	5	1,282,012.50	404,350.00	
London	1	*260,000.00		
London Twp.	7	120,812.00		
<u>London Twp.(Bell Tele- phone Co. of Can)....1</u>		7,200.00		
<u>London Twp.(Fellner Construction Co. London).....2</u>		149,673.94		
<u>London Twp.(Sifton Construction Co. London).....1</u>		122,027.72		
<u>London Twp.(University Heights Development Ltd. London).....2</u>		68,000.00		
Louth Twp.	1	7,500.00		

Water Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	
Madoc	1	35,540.00		
Maidstone Twp.	6	515,705.00		
Malden Twp.	2	37,521.00		
Marathon I.D.	1	59,327.00		
Markham	2	130,900.89		
Markham Twp.	2	166,135.00		
McKim Twp.	11	338,809.71		
Meaford	3	111,176.00	320,763.00	
Midland	3	116,350.00		
Milton(Ashbrook Estates Ltd., Toronto).....	1	3,750.00		
Mitchell	3	82,053.29	*75,292.52	
Moore Twp.(Police V. Corunna).....	1	11,892.00		
Moore Twp.(Mr. Frank Miller).....	1	4,245.00		
Nepean Twp.(Greenglen Development Corp., Ltd., Ottawa).....	1	180,000.00		
Nepean Twp.(Alvin- Steward Construction Co.,Ltd.,City View)..	1	136,078.00		
Nepean Twp.(George A. Cooper Ltd.,Ottawa)..	1	117,335.00		
Nepean Twp.(Minto Con- struction Co.,Ltd., Ottawa).....	1	179,029.00		
Nepean Twp.(Thatcher Development Co., Ottawa).....	1	159,916.00		
Newcastle	1			*170,355.00
New Liskeard	1	2,540.00		
Newmarket	1	13,960.00		
Niagara Falls	3	38,390.00		
Nipigon Twp.	1	8,060.00		
North Bay(Soldier Set- tlement & Veterans' Land Act).....	1	11,400.00		
North Bay(Hill-Clark- Francis Ltd.).....	1	16,300.00		
North Bay(Trans-Canada Pipe Lines Ltd., Toronto).....	1		75,000.00	
Norwich	1	4,000.00		
Oakville	3	94,817.80	*226,500.00	
Orangeville	4	43,730.00	71,000.00	
Orangeville(Mr. Edward Boyer).....	2	27,520.00		

Water Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
Orangeville (Messrs. V. Wright & R. Chamandy)	1	7,447.00		
Orillia	2	121,757.64		
Orillia (Mr. Ross Curtiss)	1	16,721.79		
Orillia (Mr. J.R. MacIsaac)	1	3,530.17		
Oshawa	11	341,065.00		
Ottawa	40	3,388,132.00		
Owen Sound	3	18,329.24		
Paris	1	15,804.00		
Parkhill	1	*110,000.00		
Parry Sound	1	57,325.00		
Pembroke	5	151,838.85		
Penetanguishene	2	22,050.00		
Peterborough	6	67,594.00		
Petrolia	1	9,740.00		
Pickering	2	27,215.00		
Pickering Twp.	3	123,860.00	*683,000.00	
Picton	2	4,022.50	48,800.00	
Picton (Lambert & Rollins, Belleville)	1	7,607.60		
Plantagenet N. Twp. (Police V. Planta- genet)	1	5,000.00		
Point Edward	1		*81,300.00	
Port Arthur	3	55,623.00		
Port Arthur (Forest Park Development Co.)	2	32,553.00		
Port Arthur (Mayotte Corffloor Ltd.)	1	2,787.00		
Port Dalhousie (Mr. W.C. Smiley)	1	1,250.00		
Port Dover	1	20,291.00		
Port Hope	5	76,800.00		
Port Perry	1	6,300.00		
Prescott	1	29,455.10		
Preston	6	209,124.26	23,000.00	
Preston	1		*277,000.00	
Puslinch Twp. (Guelph Developments Ltd., Toronto)	1		61,300.00	
Rainy River	1	37,200.00		
Red Rock I.D.	1		15,000.00	
Renfrew	1	30,741.45		
Richmond Hill	7	213,607.20	259,027.00	
Richmond Hill (Contem- porary Homes Ltd)	1	2,255.00		

Water Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
Richmond Hill(Mr. H.F. Heidman).....1	1	2,535.00		
Richmond Hill(Rosemar Development Co.).....1	1	4,462.50		
Richmond Hill(Mr. George Chassie).....2	2	6,240.00		
Richmond Twp.	1	14,800.00		
Ridgetown	2	1,000.00	34,050.00	
Riverside-Tecumseh	1	191,777.65		
Rochester Twp.	2	48,238.00		
Romney Twp.	1	11,241.00		
St. Catharines	1	232,090.22		
Saltfleet Twp.	3	14,940.00		
Sandwich E. Twp.	4	108,556.66		
Sandwich E. Twp.(Thi- bodeau Express Co., Windsor).....1	1	18,827.00		
Sandwich S. Twp.	3	59,286.00		
Sandwich W.Twp.	10	312,985.92		
Sandwich W.Twp.(Econo- my Home Builders Windsor, Ltd.).....1	1	17,278.00		
Sarnia	15	526,095.00		
Sarnia Twp.	6	50,653.00		
Sault Ste. Marie	1	120,000.00		
Scarborough Twp.	51	1,301,673.05		
Smiths Falls	1	10,150.00		
Stamford Twp.	7	172,508.32		
Stayner	2			68,354.47
Stoney Creek(Radovitch Associates Ltd.).....1	1	3,900.00		
Stoney Creek(N.Blan- chard & Sons Ltd., & Bartlett Builders Ltd.).....1	1	11,591.00		
Stouffville	1	21,000.00		
Stouffville(Cedar Pines Developments Ltd., Milliken).....1	1	18,925.00		
Stratford	2	6,180.00		
Strathroy	4	25,900.00		
Streetsville	1	91,350.00		
Sturgeon Falls	2	20,074.80		
Sudbury	7	155,206.00		
Swansea	2	34,328.13		
Tarentorus Twp.	1	29,040.00		
Tay Twp.	1	11,040.00		
Teck Twp.	2	59,262.00		
Thedford	1			*165,000.00

Water Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	
Thessalon	1	15,000.00		
Thornbury	1	23,964.00		
Tilbury N. Twp.	1	14,884.00		
Timmins	2	74,155.00		
Tisdale	1	8,200.00		
Tisdale(Dome Mines Ltd., South Porcupine)	1	18,000.00		
Toronto	3	23,041.00		
Toronto Metro	8	6,624.000.00		
Toronto Twp.	23	633,536.16	91,524.00	
Toronto Twp.(Applewood Dundas Ltd.).....	1	67,819.76		
Toronto Twp.(Peelport Developments Ltd., Clarkson).....	1	13,910.00		
Tottenham	1	4,400.00		
Trafalgar Twp.	5	464,428.40		
Trenton	1	28,557.55		
Tweed	1	5,125.00		
Val Albert I.D.	1			*227,075.00
Vankleek Hill	1			*164,500.00
Vaughan Twp.	6	491,191.79		
Vaughan Twp. (Police V. of Maple).....	3	16,172.00		200,000.00
Wallaceburg	1	50,700.00		
Waterloo	6	103,450.00		
Waterloo Twp.(Kitchener Water Commission)....	1	14,075.000		
Waterloo Twp.(Ellis McLaughlin & Sons)...	1		18,636.50	
Watford	1	2,605.00		
Welland	2	240,000.00		
Westminster Twp.	1	5,830.00		
Westminster Twp.(Oak- wood Construction Ltd., London).....	1	6,900.00		
Wheatley	1	689.00		
Whitby	1	610.00		
Whitby Twp.(Hamlet of Brooklin).....	2			*234,700.00
Widdifield Twp.	2	6,446.00		
Widdifield Twp.(Mr. F.H.Trudeau).....	1	8,168.00		
Widdifield Twp.(Rovela Limited).....	1	7,100.00		
Winchester	1	4,620.00		
Windsor	3	95,400.99		
Woodstock	4	134,713.47		

Water Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
Woolwich Twp. (Police V. of St. Jacobs)....1				*183,000.00
Yarmouth Twp.	4	37,480.00		
York Twp.	4	45,977.00		
York East Twp.	2	12,680.00		
York North Twp.	72	2,390.103.28		
TOTALS	866	35,813,274.17	6,102,249.77	343,354.47

*Preliminary approval only - included in total number of certificates
not included in total estimates

Certificates Issued Re Sewage Works for the Year 1959

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	\$
Acton	1	38,148.49		
Alliston	2		62,554.50	
Almonte	3	17,020.70		
Amherstburg (Calvert Distilleries Ltd.)...1		87,706.00		
Ancaster Twp.	1	11,130.00		
Atikokan Twp.	1	18,821.25		
Aurora (Sunnybrook In- vestments Ltd., Toronto).....2		151,463.55		
Aurora (Aurora Heights Limited, Toronto)....1		38,236.00		
Aylmer	2	55,125.00		
Barrie	12	160,666.01		
Barrie (Village Devel- opments Ltd. Toronto).1		14,871.00		
Belleville	3	16,607.00	*4,500,000.00	
Belleville (Lambert- Rollins Construction Ltd.).....1		1,580.00		
Bolton (Dr. Thomas M. Walker, Toronto)....1		5,820.00		
Bowmanville	4	40,773.91		
Bracebridge	1	*205,200.00	*105,000.00	
Bradford	1	67,800.00		
Brampton	5	562,011.00		
Brampton (Relaw Con- struction Ltd., Port Credit).....1		241,672.00		
Brantford	17	1,703,936.96		
Brockville	9	502,199.60		

Sewage Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
	\$	\$	\$	
<u>Burchell Lake Townsite</u> (Coldstream Copper Mines Ltd.).....1			46,560.00	
Burlington 16		346,883.70	*303,600.00	
Burlington 3		*416,650.00		
<u>Burlington</u> (Newkorn In- vestments Ltd., Toronto).....1		174,055.00		
<u>Burlington</u> (Garden Homes Development Ltd. Toronto).....1		221,550.00		
<u>Burlington</u> (Verhoeven Construction Co.Ltd.)1		132,359.00		
<u>Cedar Springs</u> (Ontario Dept. of Public Works).....1			400,000.00	
Chatham 6		323,051.00		
Chelmsford 1				*311,000.00 (part only)
Chesley 1		4,797.50		
Chinguacousy Twp. 5		622,715.80		
Chippawa 2		9,917.00		
Clinton 2		15,044.00		
<u>Clinton</u> (Mr. H.G. Hum- phrey, Beamsville)...1		6,852.00		
Cobourg 1		32,127.00		
Collingwood 1		18,300.00		
Cornwall 16		759,978.45		
Crowland Twp. 5		51,238.90		
Deep River 3		170,629.00		
Delhi 2		9,965.92		
<u>Dorchester N.Twp.</u> (Mr. E.P. Dignan,London)..1		5,570.00		
Dryden 2		22,379.00		
Dundalk 1				*48,300.00
<u>Dundas</u> (Mr. D.C. McKay, Hamilton) 1		1,689.00		
Dunnville 2		21,689.00		
Elliot Lake 2		22,500.00		
Elmira 1		5,960.00		
Espanola 2		766.00		*511,220.00
Etobicoke Twp. 105		5,150,748.69		
Fergus 1		17,400.00		
Ferris W. Twp. 2		87,632.62		
Ferris W. Twp. (Mr. Samuel Herman).....1		8,743.00		
Forest Hill Village 1		6,000.00		

Sewage Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New System</u>
Fort Erie	1 \$	1,469.70 \$		
Fort William	3	104,389.55		
Fort William	1	*1,670,000.00		
Frankford	2	3,114.15		
Galt	10	742,166.96		
Gananoque	1	7,170.00		
Georgetown	3	260,500.00	599,000.00	
Gloucester Twp. (Carle- ton County Home for the Aged).....	1		30,000.00	
Goderich	1	845.00		
Grantham Twp.	6	424,674.11		
Grimsby	1	61,247.00		
Grimsby (Mr. R. Sexsmith).....	1	8,160.00		
Grimsby (Mr. Kus- meider).....	1	3,000.00		
Guelph	11	568,733.65		
Guelph Twp.	1	8,200.00		
Gwillimbury E Twp.	2	17,380.00		
Gwillimbury N Twp.	1	15,000.00		
Hamilton (Mr. R.R. Bryers).....	1	5,300.00		
Hamilton	28	1,761,602.02		
Hamilton (Sunshine Con- struction Co.).....	1	21,200.00		
Hamilton (Mr. Harry Howard).....	1	10,460.00		
Hamilton (Mr. J.E. Seinberg).....	1	7,050.00		
Hamilton (Mr. R. Kee)	1	21,700.00		
Hamilton (Federal- Provincial partner- ship).....	1	13,700.00		
Harriston	1			*305,325.00
Hearst	1	75,792.00		
Hespeler	3	44,230.00	*14,500.00	
Ingersoll	2	36,900.00		
Iroquois (H.E.P.C. of Ontario).....	1	25,000.00		
Kapuskasing	1	17,500.00		
Kemptville	1	20,830.00		
Kenora (Ont. Dept. Public Works).....	1		43,880.00	
Kingston	13	499,076.88		
Kingston (Kingscourt Realty Ltd.).....	1	16,500.00		

Sewage Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	\$
Kingsville	1	2,033.00		
Kitchener	9	247,564.50		
Korah Twp.	1	51,000.00		
Leamington	10	104,475.00		
Leamington(Baker In- vestments Ltd., Riverside).....	1		17,655.00	
Leaside	2	210,900.00		
Lindsay	5	17,709.00		
Listowel	3	5,350.00		283,000.00 (part only)
London	17	2,578,443.27		
London(Herbert J. McLure Construction Ltd.).....	1	164,000.00		
London Twp.	3	124,245.00		
London Twp.(Sifton Con- struction Co. London)	5	543,172.63	220,273.54	
London Twp. (University Heights Development Co. Ltd., London).....	3	169,000.00	142,000.00	
London Twp. (Fellner Construction Co., London).....	3	323,777.06		
London Twp. (Bell Telephone Company of Canada).....	1	21,600.00		
London Twp.(McClure Construction Co., London).....	1	9,473.87		
Louth Twp.(Beacon Motor Hotel, Jordan Harbor).....	1		35,000.00	
Madoc	1	40,460.00		
Marathon I.D.	1	34,535.00		
Markham	5	485,267.15	274,000.00	
Markham	1	*191,000.00		
Markham(Willowdale Homes Limited).....	1	10,439.96		
McKim Twp.	4	318,423.75		
Meaford	1	11,715.00		
Midland	1	20,150.00		
Millbrook(Ont.Dept. Public Works).....	1		40,400.00	
Milton	1	8,965.00		
Milton(Ashbrook Estates Ltd., Toronto).....	1	3,650.00		
Mimico	1	7,000.00		
Mitchell	1	62,255.00		

Sewage Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	\$
Napanee	1	4,665.40		
Neelon & Garson	1	12,000.00		
Nepean Twp.	4	11,250.00	*500,000.00	900,000.00
Nepean Twp. (Greenglen Development Corp. Ltd., Ottawa).....	1	180,000.00		
Nepean Twp. (Minto Con- struction Co. Ltd., Ottawa).....	1	264,909.00		
Nepean Twp. (George A. Cooper Ltd., Ottawa)..	1	112,187.00		
Nepean Twp. (Thatcher Development Co. Ottawa).....	1	130,360.00		
Nepean Twp. (Alvin Stewart Construction Co., City View).....	1	202,660.00		
New Hamburg	1			*365,000.00
New Liskeard	2	38,195.00		
Newmarket	4	72,250.00	*902,300.00 (joint system)	
Niagara Falls	4	89,660.00		
Niagara Twp.	1	3,200.00		
Nipigon Twp.	1	2,500.00		
North Bay	3	1,041,384.00	1,520,000.00 (joint system)	
North Bay (Hill-Clark- Francis Ltd.).....	1	19,300.00		
North Bay (Soldier Set- tlement & Veterans' Land Act).....	1	5,425.00		
Oakville	3	135,328.00		
Orangeville	2	13,500.00	128,000.00	
Orangeville (Mr. Edward Boyer).....	2	27,050.00		
Orangeville (Starr Real Estate Co.).....	1	8,160.00		
Orangeville (Messrs. V. Wright & R.C. Cham- andy).....	1	7,110.00		
Orillia	6	308,934.27		
Orillia (Mr. Ross Curtiss).....	1	12,831.66		
Orillia (Mr. J.R. MacIsaac).....	1	3,759.43		
Orillia (Mr. A.E. Davey).....	1	2,081.22		
Oshawa	18	789,936.13		
Ottawa	87	5,682,933.11		

Sewage Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	
Ottawa (Urbandale Realty Corp. Ltd.)...	2	162,000.00	400,000.00	
Owen Sound	4	73,484.50		
Owen Sound	2	*581,815.00	*1,350,000.00	
Pembroke	5	22,386.00		
Peterborough	21	332,068.14		
Petrolia	1	*127,994.00	*98,515.00	
Pickering	2	78,549.00		
Pickering	1	*405,700.00	*80,000.00	
Picton	2	44,254.19		
Point Edward	2		*201,265.00	492,735.00
Port Arthur	3	40,952.00		
Port Arthur (Forest Park Development Co.).....	2	50,944.00		
Port Arthur (Mayotte Corffloor Ltd.).....	1	2,886.00		
Port Colborne	1		*570,000.00	
Port Credit	1	1,700.00		
Port Dalhousie (Mr. W.C. Smiley).....	1	1,145.00		
Port Hope	2	36,045.12		
Prescott	3	13,628.40		
Preston	7	130,900.00	7,000.00	
Renfrew	2	43,779.36		
Richmond Hill	5	540,738.00		
Richmond Hill (Contem- porary Homes Ltd.)...	1	3,280.00		
Richmond Hill (Mr. Geo. Chassie).....	2	8,750.00		
Richmond Hill (Mr. H.F. Heidman).....	1	2,507.00		
Richmond Hill (Section Development Co. Ltd.)...	1	116,856.18		
Richmond Hill (Rosemar Development Co.).....	1	15,788.35		
Ridgetown (Ont. Dept. Public Works).....	1		44,500.00	
Riverside	3	67,437.00		
St. Catharines	4	448,865.00		
St. Clair Beach	1	14,250.00		
St. Thomas	5	57,075.00		
Saltfleet Twp. (T.C.&B. Investments, Bur- lington).....	1		7,050.00	
Saltfleet Twp. (Bart- lett Builders Ltd., Stoney Creek).....	1		15,333.00	

Sewage Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	
Sandwich E. Twp.	1	261,077.00		
Sandwich S. Twp.	1	10,545.00		
Sandwich W. Twp.	2	63,396.00		
<u>Sandwich W. Twp. (Eco- nomy Home Builders Windsor Ltd.)</u>	1	33,253.00		
Sarnia	26	1,519,660.00		
Sault Ste. Marie	6	1,341,121.30		
Scarborough Twp.	79	5,529,826.01		
Schreiber Twp.	1		*33,075.00	*260,266.78
Seaforth	1	*105,200.00		
Simcoe	2	23,451.25		
Smiths Falls	1	8,950.00		
Stamford Twp.	8	670,704.82	25,789.71	
Stirling	3	8,934.00	27,500.00	193,979.00
Stoney Creek	2	13,303.00		
<u>Stoney Creek (Radovitch Assoc. Ltd., Toronto)</u>	1	22,150.00		
<u>Stoney Creek (N. Blan- chard & Sons, Ltd., & Bartlett Builders)</u>	1	30,746.00		
Stouffville	1			668,697.38
<u>Stouffville (Cedar Pines Developments Ltd., Milliken)</u>	1	36,229.00		
Stratford	5	130,659.00		
Strathroy	2	21,680.00		
Streetsville	1	8,725.00		
Sudbury	7	408,077.00		
Swansea	2	21,360.10		
Tarentorus Twp.	4	235,000.00		
Teck Twp.	1	14,168.00		
Tecumseh	1	18,895.00		
Thorold	1	4,523.00		
<u>Thorold & Merritton (Dept. Transport, Ottawa)</u>	1	795,650.00		
Tillsonburg	2	40,000.00	330,000.00	205,000.00
Timmins	3	100,560.00	2,500.00	
Tisdale Twp.	1	13,000.00		
Toronto	46	3,494,484.00		
Toronto Metro	8	3,833,100.00		
Toronto Twp.	29	2,341,394.60	*2,224,000.00	
<u>Toronto Twp. (Peelport Developments Ltd., Clarkson)</u>	1	17,450.00		
<u>Toronto Twp. (Applewood Dundas Ltd.)</u>	1	59,636.00		
Trafalgar Twp.	10	940,244.33	22,000.00	
Trenton	7	94,961.96		

Sewage Works Certificates (Cont.)

<u>Municipality</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	
Tweed	2	14,605.00		
Vankleek Hill	1			*205,000.00
Vaughan Twp.	2	79,567.00		
Vaughan Twp. (Police V. of Maple)	1	5,272.00		
Waterloo	14	217,500.00	660,000.00	
Welland	2	27,000.00		
Westminster Twp.	3	92,415.00	178,850.00	
Westminster Twp. (Police V. of Byron).....	1	115,300.00		
Westminster Twp. (J.W. Smith Construction Ltd., Byron).....	1	4,524.00		
Westminster Twp. (Oak- wood Construction Ltd., London).....	1	32,000.00		
Whitby	3	1,565.00	540,000.00	
Whitby (Rite Construc- tion Co., Toronto)....	1	1,104.00		
Whitby Twp. (Hamlet of Brooklin).....	1	17,850.00		
Warton	1		123,902.07	
Widdifield Twp. (Mr. F.H. Trudeau).....	1	6,100.00		
Winchester	1		*35,400.00	*56,400.00
Windsor (Assumption University).....	1	83,743.00		
Woodstock	9	381,881.76		
Woolwich Twp. (Police V. St. Jacobs).....	1			*176,800.00
York Twp.	6	185,803.00		
York E. Twp.	6	164,570.00		
York N. Twp.	80	7,325,788.54		
TOTALS	1,109	64,779,965.39	5,943,747.82	2,743,411.38

*Preliminary approval only - included in total number of certificates
not included in total estimates

WATER RESOURCES DIVISION

Ground Water Branch

The demand for services and advice from the Ground Water Branch on matters relating to ground water and well problems continued to increase during 1959.

The various activities of the branch are summarized briefly below:

Well Data

Records for 7,948 water wells were filed in 1959, approximately 1,000 more than were handled the previous year. These records were an invaluable source of reliable hydrological data used in ground water survey work carried out for many municipalities. They also were available to and well used by the general public.

Licensing of Drillers and Field Inspectors

Licences were issued to 394 drilling contractors. The three inspectors made 1,295 calls on the drillers or their assistants in the field during the year. A total of 6,630 wells were examined and 19 special investigations were undertaken in connection with construction, water contamination or use of secondhand casing.

Court action was recommended in two instances where used casing was installed in water wells contrary to the water well Regulations.

County Reports

Assistance was given to other Commission branches in gathering information for county surveys. Reports were completed for the counties of Essex and Elgin, while field data were assembled and a report partially prepared for Welland county. Field work was well under way in Haldimand County by the end of the year.

Observation Well Program

Thirty-one observation wells were being measured at the end of 1959. Continuous readings of the water level variations were being made by automatic recorders in 10 of the wells. Readings were being taken manually in the remaining wells at weekly or longer intervals.

Observation wells were also used for special projects involving aquifer tests, private well interference or research at Brantford, London, Port Burwell and Woodstock during the year.

Papers

Five papers were prepared for presentation to various groups, including one which formed part of a series of lectures by the Geological Survey of Canada in Ottawa, the fall conference of the Ontario Geography Teachers' Association in London, and a joint meeting of the American Association for the Advancement of Science and the Geological

Society of America in Chicago.

Special Projects

A special geological map and generalized cross-section of formations encountered in southwestern Ontario was prepared for the annual meeting of the Ontario Water Well Association in Kitchener. Complimentary rulers showing the variation in sand sizes were provided to the drillers at the convention.

Assistance was given in the design and finishing of a mural at the Canadian National Exhibition which showed the relationship between different types of wells and the geology of an area.

Field Surveys and Investigations

Investigations and field surveys were carried out by the branch for 55 separate municipalities. Some investigations were related to minor problems of water supply or well interference and on-the-spot advice was usually sufficient to meet the problem. Investigations of this nature were carried out for, or in the vicinity of, Aurora, Barrie, Cooksville, Dundas, Edgeley, Fergus, Madoc, Maple, McKenzie Creek, Midland, Orillia, Springford, Sunderland and Warkworth.

Meetings were held with the local councils at Lions Head, Milton, Mitchell, Port Burwell, Wellington and Bloomfield with representatives of other branches of the Commission to look into their water supply problems or assist them in proceeding with the installation of new waterworks system.

Investigations into well interference of some magnitude was carried out for the Brampton-Bramalea, Township of Brantford, London and Preston areas. Aid in the interpretation of pumping test data was sought by Bradford, Shelburne and Watford.

Requests for ground water surveys were made to the Commission by a number of municipalities with which there were no test-drilling or project agreements. A report was prepared in each case and made available to the municipality. Involved were Aylmer, Ayr, Brechin, Deseronto, Exeter, Glencoe, Lanark, Minden, Township of West Flamboro, Township of Whitchurch, Walkerton and Wolverson. Brechin and Deseronto undertook test-drilling as recommended in the reports and sought the assistance of the branch in the interpretation of their results.

Test-Drilling Projects Completed

The towns of Orangeville and Preston, which had commenced test-drilling programs in 1958, completed them successfully in 1959.

Eight municipalities undertook test-drilling programs as OWRC projects during the year. Seven of these were completed successfully--Caledon East, Cannington, Cookstown, Elmvale, Newcastle, Stayner and Thedford--and in one case, Marmora, a river supply was recommended when test-drilling results were poor.

Test-Drilling Projects Incompleted

Four municipalities were involved in test-drilling programs

which were in various stages of completion at the end of 1959--Chester-ville, Grand Bend, Tara and Val Albert.

Test-Drilling Projects Ready to Start at Year-End

Ground water surveys had been completed for four municipalities which were about ready to proceed with their test-drilling programs at the end of the year--Brooklin (Township of Whitby), McGregor (Townships of Anderdon and North Colchester), Orono (Township of Clarke) and Waterdown.

Surface Water Branch

This branch became an actuality during the month of May with the transfer of a nucleus of staff from elsewhere in the Commission.

Programs related to the compilation of information on surface water resources were initiated or continued. The major features of these programs are participation in water resources surveys on a county basis, accumulation and tabulation of hydrological data, review of water resources programs in other areas, and preliminary reporting on the development of water works or sewage works in specific municipalities.

County Water Resources Surveys

The co-ordination of water resources surveys rests with both branches of this division. The reports are the joint effort of staff from the divisions of Sanitary Engineering, Laboratories and Research, and Water Resources. Each group contributes a portion specific to its particular activities.

Surveys of the counties of Welland and Haldimand were initiated during the year. The work on highly industrialized Welland County had progressed to the editing stage at the year-end. The field work in Haldimand County was well advanced.

Hydrology Records

Records of stream flows, lake levels and meteorological information as available from a variety of sources in Canada and the United States were accumulated and filed. Most of the stream flow records as co-ordinated and released by the Department of Northern Affairs and National Resources were for major streams. Some 240 gauging stations were listed in Ontario.

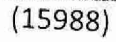
Development Reports

Where municipalities requested assistance in formulating programs with respect to the development of water or sewage works, advisory reports of a preliminary nature were undertaken. The townships of Louth, Pelham, Petawawa and Stafford were helped with water supply in 1959 and the townships of Kingston and Dysart with sewage works.

Special Events

The Supervisor presented papers related to waste disposal pro-

cedures for the milk-processing industry to the Eastern Ontario Cheesemakers Conference at Kemptville Agricultural School and to the Toronto Convention of the Ontario Creamerymen's Association.

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